

CHEMICAL ENGINEERING

ALFRED S. REED
PUBLISHER

CALVIN S. CRONAN
Editor-in-Chief

In August 1946 *Chemical & Metallurgical Engineering* was renamed *Chemical Engineering*. *Chemical & Metallurgical Engineering* was the successor to *Metallurgical & Chemical Engineering*, which, in turn, was a consolidation of *Electro-Chemical & Metallurgical Industry* and *Iron & Steel Magazine*. The magazine was originally founded as *Electrochemical Industry*.

McGRAW-HILL INC., NEW YORK CITY

VOLUME 84

January to December 1977

GENERAL ALPHABETICAL INDEX

A					
Absorption			"Super slurpers" USDA researchers report a boost in distilled-water absorptency (C)	74	
Comparing equilibrium stages with transfer units, Atef Aly Manieh (charts) (P.N.) May 9	163		Admantane—Japanese process for adamantane employing new isomerization catalyst (C)	54	
Right absorber oil cuts operating costs, Paul Adler	125		Adsorption		
Acetate—Celanese Fibers to close acetate yarn plant at Rome, Ga. (N)	61		Amoco's cold-bed adsorption technique ups efficiency of sulfur recovery from sour gas (C)	55	
Acetone			Rohm & Haas's class of synthetic adsorbents: Ambersorb carbonaceous adsorbents (C)	17	
Gulf phenol facility to co-produce acetone (N)	57		Treating industrial wastewater with activated carbon, Joseph L. Rizzo and Austin R. Shepherd (charts, tables, flowdiagrams) . . .	95	
Shell starts world's largest phenol plant at Deer Park, Tex. (N)	77		Letter	5	
Acids			Aerosols		
Adjusting pH with acid or caustic, F. Caplan (nomograph) (P.N.)	143		Fluorocarbon controversy		
Bayer AG & Degussa: peracid route to propylene epoxidation (C)	59		Fluorocarbons-propellant ban not likely to spread to Europe, except in Sweden (C)	36	
Acrylates—Rohm and Haas plant at Deer Park, Tex., onstream (N)	99		Manufacture of fluorocarbon propellants would end by Oct. 15, 1978 under a joint proposed regulation (C)	96	
Acrylonitrile			Agricultural Chemicals-CE construction alert (R) Mar. 28-113	101	
Bottles			Agricultural Chemicals see also Fertilizers		
FDA plans to rescind permission for sale of carbonated beverages in nitrile copolymer bottles (C)	113		Air Pollution		
Monsanto shuts down three bottle plants (C) Mar. 14	73		Allied's Semet-Solvay Div. coke plant at Ashland, Ky., blacklisted by EPA (C) . . Feb. 28	116	
FDA's Kennedy says acrylonitrile beverage bottles must end by Dec. 22 (C) . Oct. 10	72		Analyze stack gases via sampling or optically, in place, H.A. Klasens (diagrams, tables) . . .	201	
Carbonated-drink packs: FDA tests and rulings, Richard Greene (N)	59		Asthma attacks related to particulate and sulfate levels in air? EPRI says not necessarily (C)	95	
Du Pont textiles plant in Camden, S.C.: acrylonitrile carcinogenicity studied (C) June 6	67				
Japanese-U.S. pair evaluate new acrylonitrile/maleic anhydride process (C) Feb. 28	113				
			Benzene emissions see Benzene		
			California: Massive review of air pollution rules underway (C)	42	
			Catalysts Noxon 500 help nix flue-gas NO _x (N) Feb. 14	31	
			Controlling air pollutants from stationary sources can lower death rates (C) . . June 6	69	
			Cyclones: New design approach boosts efficiency, Wolfgang H. Koch & William Licht (tables, graphs)	*80	
			Cyprus Copper's copper refining process reduces costs, polluting (N)	58	
			EPRI pollution-monitoring system scans a large portion of the U.S. (C)	70	
			Environmental engineering DESKBOOK see DESKBOOKS		
			EPA considers proposals for air-pollution tradeoffs: CPI agreements with other companies (C)	54	
			EPA says Corpus Christi Petrochemical's new ethylene facility won't meet EPA's emissions policy (N)	69	
			Flue-gas-cleaning wastes disposal, Julian W. Jones (map, tables)	*79	
			Fluorocarbon controversy		
			Fluorocarbons-propellant ban not likely to spread to Europe, except in Sweden (C)	36	
			Manufacture of fluorocarbon propellants would end by Oct. 15, 1978 under a joint proposed regulation (C)	96	
			Fuller's baghouse fights pollution in a big way for Armco Steel	*106	
			GM to employ "three way" catalytic converters (C)	69	
			Japan's Ube Industries combined air-pollution control with caprolactam production (C) June 6	68	

NOTES—*Illustrated: (C) Cumentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Kemron's computer retains air-quality data (N)	July 18	57	(charts)	June 6	135	New plot enhances value of batch-thickening tests. Eli Barnea (tables, graphs)	Aug. 29	75
Measuring pollutants in stack gases (tables, diagrams)	Jan. 31		European aromatics prices fall: forces benzene-process changes at Essochem (C)	Nov. 21	113	Batteries		
Tracer-gas system determines flow volume of flue gases. John Knoepke	Jan. 31	91	Asbestos			Battelle Columbus Laboratories: energy-storage water batteries may supplement peak-load electrical demands (C)	June 20	59
CO ₂ measurements can correct for stack-gas dilution. Harry C. Lord	Jan. 31	95	Cancer causing materials requiring registration in California by July 1 (C)	June 20	60	Zinc-air button-cell batteries to be marketed by Gould Inc. (C)	Aug. 1	19
MMT additive see Methylcyclopentadienyl Manganese Tricarbonyl			FMC charged with polluting the Kanawha River in West Virginia with asbestos (C)	May 23	95	Zinc-chlorine load-leveling battery development (C)	Feb. 14	25
NO _x : EPA sets its sights on nixing CPT's NO _x emissions. Larry J. Ricci (N) (tables) (R) Pt. 1 Feb. 14-23/33, Pt. 2 Apr. 11 *84 Pt. 3	Apr. 25	70	Asphalt—GulfOil Canada to test its sulfur-asphalt binder on Michigan state highway (C)	July 18	52	Bearings—Finding and fixing hot pump bearings. Robert Shields	Dec. 19	103
Pulp and paper: Tougher air-quality rule, for pulp-and-paper won't cause a capital shortage (C)	Jan. 17	70	Association of Energy Engineers—Engineers concerned about energy matters band together (C)	Sept. 26	43	Belts		
Scrubbers see Scrubbers			Atomic Power			Calculating the required tension on V-belts. Bill Sisson (nomograph) (P.N.)	May 9	164
Spanish moss: Air pollution indicator may be new application (N)	Apr. 11	79	BASF's nuclear power plant hopes dim again (C)	Jan. 3	35	Installing and maintaining V-belts. Graham W. Howard (table, diagram)	July 18	117
Sulfur removal see Desulfurization: Sulfur			Energy options to the year 2000—report. Richard E. Balzhiser (charts & tables) (R)	Jan. 3	*72	V-belt problems and solutions. Graham W. Howard (tables, diagrams)	Aug. 15	167
TVA capitulates to EPA; to install air pollution control equipment (C)	Apr. 11	74	Mixed-oxide-fuel policy bogging down (C)	Apr. 25	60	Benzene		
Vinyl-chloride monomer emission standards' amendments (C)	June 20	62	Nuclear fuel reprocessing: Carter's clamp-down on plutonium-fuel development may force Allied-General's Barnwell, S.C., plant to wind down activities (C)	Apr. 25	60	Capital spending: Report reveals CPI growth-signals. Richard Greene (table) (N)	Nov. 7	56
Court fight looms over proposed revision (C)	Aug. 1	20	Nuclear-power prospects soured by oxide-fuel reprocessing stall. Peter R. Savage (table) (N)	Feb. 28	*123	Dynamic challenges for tomorrow's CPI—report: Materials and energy		
Western Precipitation data bank provides operating information about a-control installations (C)	Feb. 14	26	Nuclear waste disposal: efforts of world-wide groups. Peter R. Savage (N)	June 20	*72	Future supply and demand for basic petrochemicals. Eugene J. Debrecezi (charts)	June 6	135
Alcohol			Swedish study warns if coal- or oil-burning power plants were to replace nuclear facilities, there would be serious health and environmental effects (N)	May 9	93	Emissions: EDF seeks to force limits (C) Mar. 28		56
Dutch make alcohol from whey (N)	Nov. 7	60	World's first commercial-size plant using HGR for its steam supply online (N)	Jan. 17	75	European aromatics prices fall: forces benzene-process changes at Essochem (C)	Nov. 21	113
Japanese process yields aldehydes and alcohols via oxidation of toluene derivatives (C)	July 4	63	Australia			OSHA		
Philippines: Gasoline substitute—alcohol from molasses (N)	Sept. 12	93	ICI plans PP plant in Sidney's Botany Bay (N)	May 23	99	Federal "guidelines" limit benzene exposure in workplace to 1 ppm. (C)	Jan. 31	56
Alcohol, methanol see Methanol			Japanese-Australian pilot plant to convert so-called "brown coal" into coking coal planned (N)	Apr. 25	65	OSHA says benzene exposure in workplaces must be cut ten times from the level now allowed (C)	May 9	88
Alloys			Shale oil feasibility study (N)	Apr. 11	79	U.S. court orders a delay in enforcing new exposure standards (C)	June 6	70
Alcoa and ERDA's direct-reduction method for making aluminum-silicon alloy (C)	Sept. 26	42	Automobiles			OSHA standard curtailing worker exposure to benzene: Emergency Temporary Standard-economic impact. Philip M. Kohn (N)	July 18	64
Wear and galling can knock out equipment. W.J. Schumacher (tables)	May 9	155	Air pollution see Air Pollution			Benzene appears on EPA's outflow list	July 18	66
Welding practices that minimize corrosion. Frank C. Brautigam	Feb. 14	*97	Chrome-coating process for plastic parts from Varian (N)	Nov. 7	47	Shell Chemical's Norco, La. installation (C)	Sept. 26	41
Alum—Imperial West uses aluminum-mill metal wastes to make alum (C)	Oct. 10	69	Diesel-powered-cars to fuel higher refinery costs (N)	June 6	75	Bins—Outdoor bulk storage for hydrophilic materials. Jesse C. Z. Ku & Denis Beval (tables, diagrams, graphs)	Aug. 29	*69
Alumina—Superior Oil's process wins oil, minerals from shale (N)	Apr. 25	65	Engines see Engines			Biomass		
Aluminum			GulfOil Canada to test its sulfur-asphalt binder on Michigan state highway (C)	July 18	52	Chemical feedstock alternatives: reducing dependence on petroleum (C)	Oct. 24	72
Alcoa and ERDA's direct-reduction method for making aluminum-silicon alloy (C)	Sept. 26	42	Lube oils see Lubrication			DOE's biomass and fermentation programs: liquid fuel production (C)	Nov. 7	44
Imperial West uses aluminum-mill metal wastes to make alum (C)	Oct. 10	69	Plastics move to make a bigger dent in cars. Rita McKay (table) (N)	July 4	78	Outlook for biomass—American Gas Assn. annual meeting (N)	Nov. 21	117
Recycling: Needs and knowhow boost aluminum recycle. Guy E. Weismantel (table, diagram) (N)	May 9	*98	Tires see Tires			Bleaching—Pulp-bleaching process cuts costs, time, effluent. Philip M. Kohn (table, flow sheet)	Feb. 28	136
American Institute of Chemical Engineers			Awards			Blending		
Annual Meeting (69th) Uranium enrichment methods detailed. Philip M. Kohn (diagrams)	Jan. 31	74	Kirkpatrick Chemical Engineering Achievement Award			Calculate fertilizer blends by nomograph. Bill Sisson (nomograph, table) (P.N.)	Mar. 14	156
Petro Expo '77			Nominate a candidate for group-achievement recognition (N)	Feb. 14	38	Custom processing: uses. David B. Carpenter (tables)	Oct. 10	129
Highlights of exhibits	Feb. 28	141	Five finalists strive (N)	July 18	62	Boilers		
New products and services	Feb. 28	169	UC, Davy Powergas, and Johnson Matthey win (C)	Oct. 24	71	Additives: Fuel-efficiency thrust ups sales to the CPI. Larry J. Ricci (graph) (N)	Nov. 7	52
Ammonia			Story behind the Award (Ed)	Dec. 5	5	Boiler burns coal, oil, gas and wastes	Dec. 19	*47
Ammonia from coal as natural gas prices rise. David Netzer & James Moe (flowsheet, graph, tables)	Oct. 24	129	1977 Kirkpatrick Chemical Engineering Achievement Award—report	Dec. 5	109-124	Boiler-fuel slurries of 50/50 coal and oil make economic sense at large installations—GM study for DOE & EPA (C)	Nov. 7	41
Ammonia-from-coal demonstration plant using Texaco process: ERDA and W. R. Grace agreement (C)	Sept. 12	87	Winners			Celanese adds cogeneration unit to its coal-fired boiler project at Pampa, Tex. (C)	Sept. 12	87
Fertilizer supply and demand: outlook. John R. Douglas & Charles H. Davis (tables, graphs)	July 18	*89	Top award to Union Carbide, Davy Powergas and Johnson Matthey: Low-pressure oxo process yields a better product mix Dec. 5		110	Operating performance of steam-heated reboilers. Albert E. Helzner (diagram, tables)	Feb. 14	73
Hydrogen recovery unit ups NH ₃ -plant efficiency. Roy Banks (flowscheme, table, graph)	Oct. 10	90	Honorable Mentions			—Letters	Oct. 24	5
Petrocarbon's cryogenic separator at Vistron Corp.'s plant in Lima, O. recovers H from ammonia purge gas (C)	Aug. 1	17	Air Products and Chemicals: Nitrogen trifluoride by direct synthesis	Dec. 5	116	Physical properties of selected gas-streams. V. Ganapathy & others (graphs)	Feb. 28	195
Production: new feeds and processes. Peter P. Savage (flowsheet) (N)	Oct. 24	*79	Exxon: Winning more from heavy oils	Dec. 5	118	UC's Brownsville boilers take aqueous wastes as primary fuel (C)	July 4	61
Production curtailments (C)	Feb. 14	27	Mobile-Bader: Better path to ethylbenzene	Dec. 5	120	Book Reviews		
Seattle scraps a plan to make ammonia from municipal solid wastes (N)	Apr. 25	65	Tenneco: Carbon monoxide from lean gases	Dec. 5	122	Air monitoring survey design. Kenneth E. Noll & Terry L. Miller	Aug. 15	14
TVA ammonia from coal unit employs Texaco gasification process (C)	June 6	69	Batch Operation			Ammonia. Part III. A. V. Slack & G. Russell James	May 9	11
Ammonium Nitrate—Gulf Oil Chemicals to replace 12 plants at Pittsburg, Kan. with one big one (C)	Nov. 21	112	Distillation: Shortcuts for distillation design—report. Otto Frank (tables, graphs, charts, diagrams) (R)	Mar. 14	*110	Automatic control systems. Richard M. Phelan	Sept. 26	12
Anthraquinone—Naphthalene-based dyestuffs-intermediate plant for Schelde Chemie Brunsbuetel GmbH (C)	Sept. 26	43	How to design a metering system. G. R. Balasubramanian & K. Sivasankaran (flowscheme)	Aug. 29	96	Betz handbook of industrial water conditioning. 7th ed. The engineering and technical staff of Betz Labs, Inc.	Feb. 14	11
Antibiotics—Schuch Engineering's recovery process recycles mixed solvents from antibiotics production (C)	Sept. 12	88	Methods for conveying and weighing solids (charts, tables, diagrams)	Feb. 28	176	Book reviewing and bias. H. S. Gordon	Dec. 19	11
Antimony—Phillips' antimony-based passivation system increases throughput and gasoline yield in catalytic crackers (C)	Apr. 11	71	Designing for batch and continuous weighers. J. R. Mitchell	Feb. 28	177	Chemical and catalytic reaction engineering. James J. Carberry	Feb. 28	11
Aromatics			Using helical screws for solids handling. L. Bates	Feb. 28	183	The condensed chemical dictionary. 9th ed. Ed. Gessner G. Hawley	June 20	11
Cities Services' coal hydrogasification process: pilot-plant test to maximize liquid aromatics production (C)	Dec. 5	66				Control of air pollution sources. J. M. Marchello	July 4	11
Dynamic challenges for tomorrow's CPI—report: Materials and energy						The control of noise in ventilation systems—A designers' guide. Ed. N. A. Iqbal, T. K. Willson & R. J. Thomas	Oct. 10	11
Future supply and demand for basic petrochemicals. Eugene J. Debrecezi						Corrosion. 2 vols. 2nd ed. L. L. Shrier	Sept. 12	11

NOTES—*Illustrated: (C) Cimentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

D. C. Blackley	June 6	1	Butadiene	Dynamic challenges for tomorrow's CPI—report: Materials and energy	June 6	135	Carbon Monoxide	Basic-oxygen-furnace offgases may provide high-purity carbon monoxide (C)	Mar. 28	53		
Encyclopedia of environmental science and engineering, Ed. J. R. Paffin & E. N. Ziegler	Aug. 25	1	Future supply and demand for basic petrochemicals. Eugene J. Debrecezi (charts)	June 6	135	Mitsui Toatsu's toluene diisocyanate process avoids phosgene (C)	Mar. 14	73	Tenneco: Carbon monoxide from lean gases—Kirkpatrick Award Honorable Mention	Dec. 5	122	
Engineering investment decisions—planning under uncertainty. L. M. Rose	July 18	11	Petro-Tex Chemical shuts down Houdry-produced butadiene units (C)	Jan. 3	37	Carbon tetrachloride—FMC Corp. yells "foul" over charges it dumped carbon tetrachloride into the Kanawha River in W. Va. (C)	Mar. 14	75	FMC to combat discharges via a containment basin (C)	Oct. 10	70	
Environment impact assessment. Larry W. Canter	Nov. 21	12	Shell Chemical's Norco, La. installation	Sept. 26	41	Carbocation—Kerr-McGee's soda ash plant exploits mineral-laden brine by carbocation. Gerald Parkinson (flowchart)	Nov. 7	62	Carboxymethylcellulose—Acetylene-based detergent builder, CMOS, set for U.S. tryout (C)	Mar. 28	53	
Environmental aspects of nuclear power. Geoffrey G. Eichholz	Aug. 29	11	Supplies to remain tight in the U.S. (N/July 4)	May 23	114	Careers—Chemical engineers in the metals field: the future of metallurgy. John D. Morgan, Jr. and Ralph C. Kirby (charts, flowcharts)	June 20	111	Catalysts	Air Products & Chemicals' catalytic cracking regeneration promoter (C)	Apr. 11	71
Environmental assessment and impact statement handbook. Paul N. Cheremisinoff & Angelo C. Morresi	Nov. 21	12	Butyraldehyde—Low-pressure oxo (LPO) process produces butyraldehyde from propylene and synthesis gas (C)	Oct. 24	71	Amery 5000: Additive saves fuel oil, reduces air pollution (table)	Jan. 17	*89	Badger's methanol-to-gasoline plant under DOE contract to use Mobil's zeolite catalyst technology (C)	Dec. 5	67	
Filtration post-treatment processes. Richard J. Wakeman	Feb. 14	11	Kirkpatrick Award winner	Dec. 5	110	Chevron Research's hydro-cracking catalyst, plus a processing scheme enables refiners to more easily shift the output ratio of the products (C)	Apr. 11	73	Crude-oil cracking gains. John C. Davis (table, flowchart) (N)	June 6	78	
Food engineering systems. Vol. 1—Operations. Ed. Arthur W. Carr	Aug. 29	11	Buyers' Guide	July 18	112	Exxon's catalyst (RT-621) upgrades heavy residuals and crudes (N)	Oct. 24	77	FCC units get crack catalysts. John C. Davis (N)	June 6	77	
Fundamentals of momentum, heat and mass transfer. 2nd ed. J. R. Welty, C. E. Wicks & R. E. Wilson	Feb. 28	11				GM to employ "three way" catalytic converters (C)	June 6	69	Japanese process for adamantane employing a new isomerization catalyst (C)	Jan. 31	54	
Handbook for chemical technicians. Howard J. Strauss; ed. Milton Kaufman	Jan. 17	11				Mitsubishi's expansion of 2-ethylhexanol capacity using a rhodium catalyst (C)	Feb. 14	25	Noxon 500 catalysts help mix flue-gas NOx (N)	Feb. 14	31	
Handbook of industrial noise management. Richard K. Miller	Aug. 1	11				Phillips' antimony-based passivation system increases the throughput and gasoline yield in catalytic crackers (C)	Apr. 11	71	Standard Oil (Indiana) catalyst cuts SOx from generators (C)	Apr. 11	71	
Hazardous materials. Leroy Schieler & Dennis Pauze	June 6	11				Testing olefin-polymerization catalysts. R. F. Gold & others (tables, diagrams)	Jan. 31	*119	Water-gas shift reaction takes place at 95°C using a new catalyst: hydrogen producing reaction (C)	July 18	52	
The health hazards of NOT going nuclear. Peter Beckmann	Aug. 29	15										
Industrial noise control handbook. Paul N. & Peter P. Cheremisinoff	Aug. 1	11										
Industrial wastewater management handbook. Ed. Hardam S. Azad	Apr. 11	11										
Maintenance engineering handbook. L. R. Higgins & L. C. Morrow	Dec. 5	12										
Management of engineering projects. Victor G. Hajer	Oct. 24	12										
Mercury contamination: A human tragedy. Patricia A. Ditri and Frank M. Ditri	Nov. 7	12										
The new heat transfer. Vol. II. E. F. Aduturi	Mar. 14	11										
The nuclear power controversy. Ed. Arthur W. Murphy	Aug. 29	12										
Plagues and peoples. William H. McNeill	Mar. 28	11										
Power generation: Air pollution monitoring and control. Kenneth E. Noll & Wayne T. Davis	May 23	13										
Plastics engineering handbook (Soc. of the Plastics Industry, Inc.) 4th ed. Ed. Joel Frados	Jan. 31	12										
Pressure vessels—The ASME code simplified. 5th ed. Robert Chuse	Oct. 10	12										
Principles of pyrometallurgy. C. B. Alcock	July 4	12										
The properties of gases and liquids. 3rd ed. Robert C. Reid, John M. Prausnitz & Thomas K. Sherwood	June 20	11										
Science and technology of oil shales. T. F. Yen	Jan. 3	14										
Stacking blending reclaiming of bulk materials. Ed. Reinhard H. Wobbiier	Dec. 5	11										
Statistics and experimental design in engineering and the physical sciences. 2 vols. 2nd ed. Norman L. Johnson & Fred C. Leone	Sept. 12	12										
Strategy of pollution control. P. Mac Berthouex & Dale F. Rudd	May 23	13										
Substitute natural gas: Manufacture and properties. W. L. Lom & A. F. Williams	Jan. 31	11										
Thermochemical kinetics (Methods for the estimation of thermochemical data and rate parameters) 2nd ed. Sidney W. Benson	May 9	11										
Trends in petrochemical technology—the impact of the energy crisis. Arthur M. Brownstein	Sept. 26	11										
20,000 words—applied and divided for quick reference. 7th ed. Compiled by Louis A. Leslie	Mar. 14	11										
The VNR concise encyclopedia of mathematics. W. Gellert & others	Nov. 7	11										
Water and wastewater treatment. Edward D. Schroeder	Oct. 24	11										
Bottles												
Acrylonitrile bottles												
FDA plans to rescind permission for sale of carbonated beverages in nitrile copolymer bottles (C)	Feb. 28	113										
Monsanto shuts down three bottle plants (C)	Mar. 14	73										
FDA's Kennedy says acrylonitrile beverage bottles must end by Dec. 22 (C)	Oct. 10	72										
Carbonated-drink packs: FDA tests and rulings. Richard Greene (N)	July 18	73										
Polyester bottle process: white acrylonitrile output shuts down (C)	Mar. 14	73										
Brazil												
Gasoline substitute: ethanol from sugar cane and manioc (N)	Sept. 12	93										
Petrobras and Pullman Kellogg agree on joint R&D (C)	Aug. 1	19										
Platform-mounted pulp plant gets set to sail. Richard Greene (diagram) (N)	Aug. 29	30										
Brine												
GSL's potash flotation process produces sulphate-of-potash fertilizer from brine. R. Bruce Tippin (flowcharts)	July 18	73										
Kerr-McGee's soda ash plant exploits mineral-laden brine by carbocation. Gerald Parkinson (flowchart)	Nov. 7	162										
Canada												
Amoco will resume pilot-plant studies of in situ recovery of bitumen from the Athabasca oil sands (C)	Jan. 17	12										
Arctic-gas pipeline route decision awaited (C)	May 23	13										
Alcan pipeline gets tentative nod (C)	July 18	11										
Can Canada's CPI cope? Philip M. Kohn (N)	Apr. 25	53										
FDA color bans: Canada and Common Market don't agree (N)	Jan. 17	67										
P.V. Containers' process eliminates dusts in handling solid sulfur (N)	Oct. 10	75										
Quebec's proposed restrictive language legislation may cause companies to leave province (N)	June 6	75										
Cancer see Safety												
Capacitors—GE chooses dioctyl phthalate as a PCB replacement in capacitors (C)	Feb. 14	27										
Caprolactam—Japan's Ube Industries combines air-pollution control with caprolactam production (C)	June 6	68										
Carbon, Activated												
Activated carbon: prime choice to boost secondary treatment. John C. Davis (N)	Apr. 11	81										
Beaded carbon ups solvent recovery: Paracryl HR system (diagram)	Aug. 29	39										
Carborum Co. announces single-train activated carbon plant (C)	May 9	85										
Du Pont's Chambers Works, Deepwater, N.J., wastewater treatment plant uses powdered activated carbon (C)	Jan. 3	35										
Modular activated-carbon system controls odors	Feb. 14	47										
New routes compete for spent-carbon recovery. Raul Ramirez (table) (N)	Sept. 12	95										
Powdered-activated-carbon wastewater treatment process from Amoco (C)	Feb. 28	113										
Treating industrial wastewater with activated carbon. Joseph L. Rizzo & Austin R. Shepherd (charts, tables, flowdiagrams)	Jan. 3	95										
Carbon Dioxide—Excessive amounts could cause "greenhouse effect": force limits on fossil-fuel in 50 yrs—NRC study (C)	Aug. 1	20										
Carbon Monoxide												
Basic-oxygen-furnace offgases may provide high-purity carbon monoxide (C)	Mar. 28	53										
Mitsui Toatsu's toluene diisocyanate process avoids phosgene (C)	Mar. 14	73										
Tenneco: Carbon monoxide from lean gases—Kirkpatrick Award Honorable Mention	Dec. 5	122										
Carbon tetrachloride—FMC Corp. yells "foul" over charges it dumped carbon tetrachloride into the Kanawha River in W. Va. (C)	Mar. 14	75										
FMC to combat discharges via a containment basin (C)	Oct. 10	70										
Carbocation—Kerr-McGee's soda ash plant exploits mineral-laden brine by carbocation. Gerald Parkinson (flowchart)	Nov. 7	62										
Carboxymethylcellulose—Acetylene-based detergent builder, CMOS, set for U.S. tryout (C)	Mar. 28	53										
Careers—Chemical engineers in the metals field: the future of metallurgy. John D. Morgan, Jr. and Ralph C. Kirby (charts, flowcharts)	June 20	111										
Catalysts												
Air Products & Chemicals' catalytic cracking regeneration promoter (C)	Apr. 11	71										
Amery 5000: Additive saves fuel oil, reduces air pollution (table)	Jan. 17	*89										
Badger's methanol-to-gasoline plant under DOE contract to use Mobil's zeolite catalyst technology (C)	Dec. 5	67										
Chevron Research's hydro-cracking catalyst, plus a processing scheme enables refiners to more easily shift the output ratio of the products (C)	Apr. 11	73										
Crude-oil cracking gains. John C. Davis (table, flowchart) (N)	June 6	78										
Exxon's catalyst (RT-621) upgrades heavy residuals and crudes (N)	Oct. 24	77										
FCC units get crack catalysts. John C. Davis (N)	June 6	77										
GM to employ "three way" catalytic converters (C)	June 6	69										
Japanese process for adamantane employing a new isomerization catalyst (C)	Jan. 31	54										
Mitsubishi's expansion of 2-ethylhexanol capacity using a rhodium catalyst (C)	Feb. 14	25										
Noxon 500 catalysts help mix flue-gas NOx (N)	Feb. 14	31										
Phillips' antimony-based passivation system increases the throughput and gasoline yield in catalytic crackers (C)	Apr. 11	71										
Standard Oil (Indiana) catalyst cuts SOx from generators (C)	Apr. 11	71										
Testing olefin-polymerization catalysts. R. F. Gold & others (tables, diagrams)	Jan. 31	*119										
Water-gas shift reaction takes place at 95°C using a new catalyst: hydrogen producing reaction (C)	July 18	52										
Caustic Soda												
Adjusting pH with acid or caustic. F. Caplan (nomograph) (P.N.)	Aug. 1	143										
Bechtel and Goodrich in joint chlor-alkali venture (C)	Aug. 1	19										
Cellulose—Celanese Cyrtel process yields cellulose-based tobacco supplement. Mark D. Rosenzweig (flowchart)	June 20	*80										
—Letter	Oct. 24	160										
Cement—Ube's (Japan) cement sails to U.S. (N)	Sept. 26	47										
Centrifuges												
Japan: Gas centrifuges gain in Japanese U-enrichment (N)	Jan. 3	4										
Texas A&M Univ., technique for recovering oil from coconuts without preliminary drying (C)	Aug. 29	17										
A viewing port for spattering processes. T. Hershey (P.N.)	Apr. 11	160										
Ceramics—Hot future for ceramics. James H. Mannon (N)	Dec. 5	*75										
Chem Show 1977												
Invitation to the Chem Show (Ed)	Nov. 21	5										
The 1977 Chem Show—report	Nov. 21	313-40										
Preview	Nov. 21	313										
Exhibitors	Nov. 21	329										
Highlights	Nov. 21	377										
"Chemical Engineering"—Past, present and future (Ed)	June 6	5										
Chemical Engineering Refresher												
Plant layout. Robert Kern (charts, tables, diagrams) (R)												
1. How to manage plant design to obtain minimum cost	May 23	*130										
2. Specifications are the key to successful plant design	July 4	*123										
3. Layout arrangements for distillation columns	Aug. 15	*153										
4. How to find the optimum layout for heat exchangers	Sept. 12	*169										
5. Arrangements of process and storage vessels	Nov. 7	93										
6. How to get the best process-plant layouts for pumps and compressors	Dec. 5	131										
Chemical Engineering Reports												
Cost-effective thermal insulation. Michael R.												

NOTES—*Illustrated: (C) Chementator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Harrison & Charles M. Pelanne (tables, graphs) Dec. 19	62-76	Tenneco: Carbon monoxide from lean gases Dec. 5	122	Magnetized steel wool for cleaning solvent-refined coal tested by MIT (C) Mar. 23	95
Cost estimating for major process equipment. Arkadia Pkukik & Hector E. Diaz (tables, graphs) (R) Oct. 10	106-122	1977 Special Reports (Ed) Jan. 3	5	Coal	
A decade of water-pollution control (graphs, flowschemes, tables) (R) Aug. 15	124-151	OSHA moving to balance health and safety Apr. 11	108-120	AEP to build pressurized fluidized-bed combustor for Ohio Power (C) Aug. 29	18
The next stage of regulation: specific pollutants-interview with Thomas C. Jorling Aug. 15	125	Pt. I OSHA—Where it stands, where it's going. William P. Demery Apr. 11	110-113	Ammonia from coal as natural gas prices rise. David Netzer & James Moe (flowsheet, graph, tables) Oct. 24	129
Industry's view - roundtable discussion Aug. 15	127	Pt. II A comprehensive approach to occupational safety and health. Ralph M. Gelburd Apr. 11	114-117	Ammonia production: new feeds and processes. Peter R. Savage (flowsheet) (N) Oct. 24	79
Guide to wastewater treatment: Biological-system developments. Davis L. Ford & Lial F. Tischler Aug. 15	131	Pt. III Industrial hygiene control methods. Richard E. Scherberger Apr. 11	118-120	Banner Industries technique—"A process to re-structure coal fines into usable form" (C) May 9	88
Physical and chemical methods. Peter B. Lederman Aug. 15	135	Shortcuts for distillation design. Otto Frank (tables, graphs, charts, diagrams) (R) Mar. 14	110-128	Boiler-fuel slurries of 50/50 coal and oil make economic sense at large installations—GM study for DOE & EPRI (C) Nov. 7	41
The effects of water-pollution control on energy consumption. J. I. Stevens & C. L. Kusik Aug. 15	139	Techniques for saving energy in processes and equipment (flowsheets, graphs, table) (R) July 4	98-112	British push supercritical coal-extraction (N) Aug. 29	23
Multimedia assessment: an integrated approach to pollution. Eugene E. Berkau & others Aug. 15	148	Balancing energy costs against equipment costs. S. B. Zdonik July 4	99	Carter's energy proposals (C) May 9	88
Dynamic challenges for tomorrow's CPI (charts & tables) (R) June 6	103-166	Optimizing the ICI low-pressure methanol process. A. Pinto & P. L. Fogerson July 4	102	Celanese adds congeneration unit to its coal-fired boiler project at Pampa, Tex. (C) Sept. 12	87
Overview		A formaldehyde process to accommodate rising energy costs. C. W. Horner July 4	108	Chemical feedstock alternatives: reducing dependence on petroleum (C) Oct. 24	72
Today's leaders explore tomorrow's challenges—roundtable discussion June 6	104	Equipment-purchasing policies that save energy. Enrique J. Armstrong July 4	110	Coal-combustion pilot power plant planned (N) Jan. 31	61
Forecasting and planning. Al Nicholas June 6	114	What to do when disaster strikes—Stardust plant fire. Henry E. Webb, Jr. (checklist, map) Aug. 1	46-58	Coal conversion: ERDA's demonstration program. John C. Davis (tables) (N) Oct. 10	77
Future changes in chemical engineering. J. M. Leathers June 6	119	Chemical Industry		The Coalcon project Oct. 10	79
Materials and energy		Canada: Can Canada's CPI cope? Philip M. Kohn (N) Apr. 25	67	Conversion: some of the President's proposals draw criticism from Congress (C) June 6	70
Energy and petrochemical raw materials through 1990. Klaus L. Mai June 6	122	CPI hardware faces longer delivery lags—McGraw-Hill survey (table) (N) June 20	78	Conversion to coal firing picks up steam. John C. Davis (N) Nov. 7	40
Industry outlook for inorganic chemicals. George M. Zapp & William T. Hewitt June 6	128	Chemicals production: conductivity measurement—what it is, how it works. Michael J. Pollack Sept. 12	161	Direct iron reduction: the role widens for natural-gas alternatives. Mark D. Rosenzweig (flowchart) (N) Feb. 28	129
Future supply and demand for basic petrochemicals. Eugene J. Debrezeni June 6	135	Du Pont consolidates its manufacturing operations (C) Nov. 7	42	Dow plans lignite-fired unit in Texas (C) Dec. 5	65
Capital		Dynamic challenges for tomorrow's CPI—report (charts & tables) June 6	103	Du Pont bolsters feedstock R&D, emphasizing coal (C) Mar. 14	75
Sources of capital for growth of process plants. Clifford Neely & Jon E. Browning June 6	142	FMC reorganizes its lines of business under nine groups (C) May 23	96	Energy options to the year 2000—report. Richard E. Balzhiser (charts & tables) (R) Jan. 3	72
Research and development		Foreign firms still favoring acquisitions in U.S. (N) May 23	99	ERDA requests proposals for a direct-combustion system feeding on Pennsylvania anthracite waste piles (C) June 20	60
Pinpointing the needs in research and development. Donald E. Garrett June 6	146	GAF will close its consumer film business and sell its dyestuffs plant (C) Aug. 15	88	ERDA wants new research ideas, reward: \$20,000 (N) Jan. 3	43
People		Government and CPI: The regulators (Ed) Sept. 26	5	Exxon oil-from-coal route gets fueled (N) Mar. 14	81
Future opportunities favor chemical engineers. Jay Matley June 6	150	Mergers & acquisitions		Exxon reorganizes coal-related research (C) Sept. 26	43
Demand for and education of chemical engineers up to 2000. James Cummings - Saxton June 6	154	Acquisition of U.S. plants by Japan's Denki Kagaku and Sweden's AB Bofors (N) Feb. 28	121	Exxon's donor-solvent coal liquefaction process will get pilot-plant tryout under ERDA agreement (C) Aug. 15	89
Government		American Can sells M&T Chemicals to Axco Industries (Societe Nationale Elf Aquitaine) (C) Sept. 26	42	Flue-gas-cleaning wastes disposal. Julian W. Jones (map, tables) Feb. 14	79
Consequences of regulation: short range long range Borden R. Putnam June 6	158	Bechtel takes 15% equity position in Peabody coal sold by Kennecott Copper (C) Aug. 1	19	Gasification see Gasification	
OSHA, EPA and plant design. Frank W. Buehner June 6	161	Diamond Shamrock's La Porte, Tex., PP plant and related business sold to Arco Polymers (C) May 9	86	Gasoline-from-coal plant costs: Fluor's study for DOE (C) Dec. 5	67
Energy options to the year 2000. Richard E. Balzhiser (charts & tables) (R) Jan. 3	72-90	FMC Corp. bids for seaweed processor Marine Colloids Inc. (C) Aug. 1	18	Germans to try coal liquefaction: Saarbergwerke to build plant (N) Aug. 1	25
How to choose a particulate scrubber. Seymour Calvert (flowschemes, diagrams, table, graph) (R) Aug. 29	54-68	Ferro Corp. sells fiber-glass operations to Reichhold (C) June 20	61	Goodyear: coal to fuel new radial-tire plant in Lawton, Okla. (C) June 20	60
In plant slurry handling—report (charts, tables, diagrams) (R) Aug. 29	94-110	Firms may merge: KemaNord and Nitro Nobel AB (N) June 20	67	Japanese-Australian pilot plant to convert so-called "brown coal" into coking coal planned (N) Apr. 25	65
1. Pipeline design for industrial slurries. A. J. Carleton & D. C. H. Cheng Apr. 25	95	General Mills' chemical-specialties operations to Germany's Henkel & Co. (C) Sept. 26	42	Magnetized steel wool for cleaning solvent-refined coal tested by MIT (C) May 23	95
2. Slurry pump selection and application. J. Ingemar Dalstad Apr. 25	101	Kaiser Industries agrees in principle to sell its engineering division to Raymond International Inc. (C) Mar. 14	73	Powdered-coal feeders will undergo development and testing at Lockheed (C) May 9	87
3. Instrumentation for slurry systems. Nicholas J. Poulis & David Silvermetz Apr. 25	107	McKee & Co.'s acquisition of Fish Engineering & Construction (C) Apr. 25	59	Slurry pipelines: Drought raises political headaches (C) Mar. 14	75
Methods for analyzing drying equipment (charts, tables, diagrams) (R) Jan. 17	104-123	Witco PB business may be sold to Shell (C) Nov. 21	111	Slurry pipelines: economics of coal-slurry pipelines look good (C) Oct. 10	71
How to classify a drying process. F. W. Dittman Jan. 17	106	Monsanto and Conoco sign agreement to build an ethylene plant at Chocolate Bayou, Tex. and a feedstocks-processing unit at Lake Charles, La. (C) Nov. 7	43	Southern Co. test burns solvent-refined coal (SRC): Wheelabrator-Frye and Gulf Mineral Resources interested in SRC (C) Aug. 1	19
Establishing the parameters for a spray dryer. F. W. Dittman & E. M. Cook Jan. 17	108	Northern Ireland's CPI: Bad tidings (N) Feb. 28	121	TVA ammonia from coal unit employs Texaco gasification process (C) June 6	69
Analyzing suspended-particle dryers with psychrometric charts. D. W. Belcher & others Jan. 17	112	Pullman Kellogg alters its Texas-headquarters hours; beefs up manpower in Houston, Tex., and Hackensack, N.J. (C) Apr. 25	59	TVA makes its largest commitment in buying coal (N) Nov. 7	47
Drying slabs, sheets, and beds. F. W. Dittman Jan. 17	118	Rising nationalism: A way to ease out of oil debts? (N) Dec. 19	33	TVA to build world's largest coal-washing plant (N) Nov. 21	117
—Letter Nov. 7	5	U.S. CPI to face new demands in chemicals-output reporting. Larry Marion (N) Aug. 29	32	U.S. and Germany form coal-research joint venture (N) Nov. 7	47
Vacuum dryers. M. R. Spotts & P. F. Waltrich Jan. 17	120	EPA relaxes rules on chemical reporting criteria (C) Dec. 5	68	Coatings	
The 1977 Chem Show Nov. 21	313-408	Chlor-alkali		Auto makers opt for Varian's chrome-coating process for plastic parts (N) Nov. 7	47
Preview Nov. 21	313	Bechtel and Goodrich in joint chlor-alkali venture (C) Nov. 21	19	How corrosion theory relates to protective coatings. Dean M. Berger (tables, diagrams) I. Aug. 1-77 II. Aug. 29	89
Exhibitors Nov. 21	329	Japan's chlor-alkali process switchover from mercury to diaphragm cells may be delayed (C) Apr. 11	71	—Letter Oct. 24	162
Highlights Nov. 21	377	Chromium—Auto makers opt for Varian's chrome-coating process for plastic parts (N) Nov. 7	47	Metallic coating from Intertec strengthens specialty piping (C) Feb. 28	114
1977 Kirpatrick Chemical Engineering Achievement Award Dec. 5	109-124	Cigarettes see Tobacco		Netco 735F-NS: tungsten-carbide powder, applied as a plasma spray to coat machine parts (C) Sept. 26	44
Winners		Clathrates—New materials freeze and thaw at room temperatures (C) Apr. 11	72	Pavement-deicing coatings (C) Jan. 17	69
Top award to Union Carbide. Davy Powergas and Johnson Matthey: Low-pressure oxo process yields a better product mix Dec. 5	110	Cleaning		Rohm and Haas Co.: Tuffak CM abrasion resistant polycarbonate coated sheet (N) July 18	57
Honorable Mentions		Dry-cleanable leather: new treatment called PolyRetanning. Vincent Cavaseno (N) Sept. 12	104	Zinc-rich primers: Applicator's guide. Dean M. Berger (charts) Mar. 14	147
Air Products and Chemicals: Nitrogen trifluoride by direct synthesis Dec. 5	116	From animal skins to leather—an ancient technique Sept. 12	104	Coke & Coke Products	
Exxon: Winning more from heavy oils Dec. 5	118			Allied's Semet-Solvay Div. coke plant at Ashland, Ky., blacklisted by EPA (C) Feb. 28	116
Mobil-Badger: Better path to ethylbenzene Dec. 5	120			Getty's sulfite scrubbing process will handle stackgas emissions from burning coke (C) Aug. 29	17

NOTES—*Illustrated: (C) Chementator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Japanese-Australian pilot plant to convert so-called "brown coal" into coking coal planned (N) Apr. 25	65	Cooling Towers—Cooling-water calculations. R.G. Kunz & others (flowscheme, tables, graphs) Aug. 1	61	Cryogenics	
Columns		Copper		Cryogenic grinding: cold-shouldered by CPI because of its cost. Larry J. Ricci (N) July 4	*71
Distillation: Shortcuts for distillation design—report. Otto Frank (tables, graphs, charts, diagrams) (R) Mar. 14	*110	Cu-winning cell thrives on slurries (N) Jan. 31	*72	A primer on cryogenic size-reduction July 4	*72
Installed cost of a distillation column. J. S. Miller & W. A. Kapella (charts, tables, diagrams) Apr. 11	*129	Cyprus Copper's copper refining process reduces costs, pollution (N) Nov. 7	58	Cryogenic grinding: three developments (N) Mar. 28	61
Combustion		Cyprus Mines Corp.'s Cymet process produces wire-bar grade copper (C) Sept. 12	90	Petrocarbon's cryogenic separator at Vistron Corp.'s plant in Lima, O. recovers H from ammonia purge gas (C) Aug. 1	17
Additives: Fuel efficiency thrust ups sales to the CPI. Larry J. Ricci (graph) (N) Nov. 7	52	Corrosion		Custom Processing—Uses of custom processing. David B. Carpenter (tables) Oct. 10	129
AEP to build pressurized fluidized-bed combustor for Ohio Power (C) Aug. 29	18	Choosing materials for sulfuric-acid services. David W. McDowell July 4	*137	Cutting process. Powder Jet, slices through thick metal sheets Apr. 11	*93
Atmospheric fluidized-bed combustion demonstration at Great Lakes Naval Station and TVA (C) Aug. 29	18	Galvanic corrosion: do you understand galvanic corrosion? C. W. Hawk, Jr. (chart, table, diagram) June 6	189		
Coal-combustion pilot power plant planned (N) Jan. 31	61	Halt corrosion in particulate scrubbers. Thomas G. Gleason (flowschemes) Oct. 24	*145		
ERDA requests proposals for a direct-combustion system feeding on Pennsylvania anthracite waste piles (C) June 20	60	How corrosion theory relates to protective coatings. Dean M. Berger (tables, diagrams) 1. Aug. 1-77, II Aug. 29	*89		
Estimating acid dewpoints in stack gases. Robert R. Pierce (charts, tables) Apr. 11	125	—Letter Oct. 24	162		
Ground-level detector tames flare-stack flames. Thomas R. Schmidt (charts & diagrams) Apr. 11	*121	Scaling-corrosion: Langelier Index of water by marble test. Arup K. Sengupta (nomograph) (P.N.) Aug. 1	83		
Communications—Write and present persuasive reports. Douglas W. Hissong July 4	131	Systematized failure analysis. R. P. Lee (charts, tables, diagrams) Jan. 3	107		
Compressors		Some unusual failure modes Jan. 31	*129		
Oilfree-air compressor runs, but doesn't "walk" June 6	*89	How poor design causes equipment failures Jan. 31	115		
Plant layout series see under CE Refresher		Volatiles corrosion-inhibitors in CPI services. Boris A. Miksic (diagrams, graph, table) Sept. 26	115		
Computers		Wear and galling can knock out equipment. W. J. Schumacher (tables) May 9	155		
Computerized on site vibration analysis offered by Exxon (C) May 23	95	Welding practices that minimize corrosion. Frank C. Brautigam Jan. 17-145 Feb. 14	*97		
Computerized system for evaluating and comparing chemical processes under development (C) Jan. 17	69	Zinc-rich primers: Applicator's guide. Dean M. Berger (charts) Mar. 14	*147		
How to verify computer programs. Stephen Ridlon (charts, tables) June 20	121				
Joint U.S.-U.S.S.R. project for better process control (C) Oct. 24	72	Costs			
Kemron's computer retains air-quality data (N) July 18	57	Coping with costly energy: the international view. Peter R. Savain (N) Aug. 1	27		
Learn computer programming the convenient way. Loren F. Hazelwood Jan. 3	103	Cost effective thermal insulation—report. Michael R. Harrison & Charles M. Pelanne (tables, graphs) Dec. 19	*62		
Microprocessors enhance computer control of plants. David L. Williams (flowcharts, graphs) July 18	*95	Cost estimating for major process equipment—report. Arkadie Pikulik & Hector E. Diaz (tables, graphs) (R) Oct. 10	*106		
Programs: Improve your efficiency in writing computer programs. Richard A. Russell Apr. 25	111	The cost of missing pipe insulation. Rene Cordero (charts) Feb. 14	*77		
Sweden: campaign to assemble information on chemicals into a central data bank—the Chemical Product Registry (C) Dec. 5	66	Data to estimate equipment capabilities in different operations. Thomas C. McKelvey (data sheet) (P.N.) July 4	146		
Tabletmaking plant of Merck Sharp & Dohme is computerized (N) Dec. 5	84	Economic evaluation of future equipment needs. Thane R. Brown (chart & table) Jan. 17	*125		
Western Precipitation data bank provides operating information about air-pollution control installations (C) Feb. 14	26	Energy-saving schemes in distillation. William C. Patterson & Thomas A. Wells (tables, graphs, flowschemes) Sept. 26	*78		
Construction		Estimating the costs of steam leaks using a "steam piccolo." Jack Goyette (P.N.) Aug. 25	*95		
CE construction alert (R) Mar. 28-101 Sept. 26	101	How to make the correct economic decision on spare equipment: George O. Davis (diagrams, tables) Nov. 21	*187		
CPI contractors size up 1977. John C. Davis (charts) (N) Jan. 3	45	Identifying and controlling health hazards from dyes: TSCA health-testing costs-sharing (N) June 20	67		
Contracting for new construction. Eric M. Bergtraun (tables) June 20	133	Installed cost of a distillation column. J. S. Miller & W. A. Kapella (charts, tables, diagrams) Apr. 11	*129		
Contacting—Distillation: Shortcuts for distillation design—report. Otto Frank (tables, graphs, charts, diagrams) (R) Mar. 14	*110	Mineral processing methods: review and forecast. Lawrence A. Roe (flowchart, diagram, table) June 20	*102		
Containers—Carbonated-drink packs: FDA tests and rulings. Richard Greene (N) July 18	59	Pitfalls in evaluating R&D. Anthony V. Perrella Aug. 1	59		
Contractors		Plant layout series see under CE Refresher			
All-maintenance firms clean up in the CPI. Mark D. Rosenzweig (N) Dec. 5	*78	Pollution control costs			
Can U.S. firms still compete abroad: tax changes and anti-boycott legislation. Guy E. Weismantel (table) (N) Aug. 29	25	Dow: "Excessive" rules cost firm \$50 million/yr. (N) Apr. 11	79		
CPI contractors size up 1977. John C. Davis (charts) (N) Jan. 3	45	Environmental protection could cost \$486 billion over the 1975-84 period (C) Jan. 31	55		
Contracts—Contracting for new construction. Eric M. Bergtraun (tables) June 20	133	Pollution-control expenditures—McGraw-Hill survey (C) May 23	94		
Controls		Right absorber oil cuts operating costs. Paul Adler Dec. 5	125		
Computers see Computers		Solar energy for process heat: cost must drop (N) Nov. 21	126		
Electrostatic precipitators in industry. Robert L. Bump (charts, tables, diagrams) Jan. 17	*129	Techniques for saving energy in processes and equipment—report (flowsheets, graphs, table) (R) Aug. 1	99		
Ground-level detector tames flare-stack flames. Thomas R. Schmidt (charts & diagrams) Apr. 11	*121	Balancing energy costs against equipment costs. S. B. Zdonik July 4	102		
Instrumenting a plant to run smoothly. Norman Lieberman (flowschemes) Sept. 12	*140	Optimizing the ICI low-pressure methanol process. A. Pinto & P. L. Rogerson July 4	108		
Conveyers—Methods for conveying and weighing solids (charts, tables, diagrams) Feb. 28	176	A formaldehyde process to accommodate rising energy costs. C. W. Horner July 4	5		
Designing for batch and continuous weighers. J. R. Mitchell Feb. 28	177	—Letter Sept. 12	110		
Using helical screws for solids handling. L. Bates Feb. 28	183	Equipment-purchasing policies that save energy. Enrique J. Armstrong July 4	109		
Cooling		Creativity			
ERDA's solar heating and cooling demonstration program: cooling units get assist from the sun (N) Oct. 24	86	Brainstorming: Comprehensive new energy-conservation program at Allied Chemical. Mark Rosenzweig (N) July 4	*74		
UC's Ozaki quench cooler employed in crude-oil cracking process prevents coking on heat exchangers (C) Sept. 26	41	It takes more than engineering talent. Jack M. Vogel Aug. 29	85		
		Play games to spark your creativity. Eugene Raudsepp Sept. 26	109		
				DESIGN	
				Calculators: Determining ideal stages on a pocket calculator. H. Tan (tables) (P.N.) Mar. 14	154
				Cyclone dust collector: How to choose one. Christian Doerschlag & Gerhard Mizek (charts, diagrams) Feb. 14	*64
				—Correction (letter) July 4	5
				Cyclones: New design approach boosts efficiency. Wolfgang H. Koch & William Licht (tables, graphs) Nov. 7	*80
				Design and analysis of industrial experiments. Thomas D. Murphy, Jr. (charts, tables) June 6	168
				Designing parallel-plates separators. Julio G. Miranda (charts, diagrams) Jan. 31	105
				Designing spouted beds. Adam Zanker (nomograph, diagrams) Nov. 21	207
				Diffusivities streamline wet scrubber design. Alex C. Mottola (diagrams) Dec. 19	77
				Distillation: Shortcuts for distillation design—report. Otto Frank (tables, graphs, charts, diagrams) (R) Mar. 14	*110
				Electrostatic precipitators in industry. Robert L. Bump (charts, tables, diagrams) Jan. 17	*129
				Estimating acid dewpoints in stack gases. Robert R. Pierce (charts, tables) Apr. 11	125
				How flow phenomena affect design of fluidized beds. Frederick A. Zenz (charts & tables) Dec. 19	81
				Incinerators: How sludge characteristics affect incinerator design. R. G. Novak & others (chart, tables, diagrams) May 9	131
				In-plant bulk materials handling (charts, diagrams, tables)	
				Powder testing techniques for solving industrial problems. Eisenhart Rothe & Peschl Mar. 28	97
				Systems approach for in-plant bulk materials handling. Schofield & Sutton Mar. 28	103
				In-plant slurry handling—report (charts, tables, diagrams) (R) Apr. 25	*94
				1. Pipeline design for industrial slurries. A. J. Carleton & D. C. H. Cheng Apr. 25	95
				2. Slurry pump selection and application. J. Ingemar Dalstad Apr. 25	*101
				3. Instrumentation for slurry systems. Nicholas J. Poulis & David Silvermetz Apr. 25	207
				Installed cost of a distillation column. J. S. Miller & W. A. Kapella (charts, tables, diagrams) Apr. 11	*129
				Microprocessors enhance computer control of plants. David L. Williams (flowcharts, graphs) July 18	*95
				Prediction of liquid activity coefficients. A. K. Rao (tables) May 9	143
				Pressure-relief valves for process plants. Robert Kern (charts, tables, diagrams) Feb. 28	*187
				Slagging coal gasifier moves to the design stage. ERDA and Conoco will share in costs and income (C) June 20	60
				Steam transmission lines design without steam traps. Mileta Mikasnovic & David R. Dau-tovich (diagrams) Mar. 14	137
				Tanks: A method for designing rectangular storage tanks. Kanti K. Mahajan (tables, diagrams) Mar. 28	107
				Tanks: Stiffer design specifications for LPG tanks improve safety (C) July 18	52
				Vessels: process and project data for vessel design. Richard E. Markovitz (tables, diagrams) Oct. 10	123
				DESIGNBOOKS	
				Environmental engineering. Doing away with pollutants in wastewater and air (R) Oct. 17	
				The Editor's page—Specific pollutants control Oct. 17	5
				Directory of environmental offices and officials (chart) Oct. 17	10
				How to get rid of toxic organics. E. G. Paulson (flowschemes, tables, charts) Oct. 17	21
				Removal of salts from process wastewaters. James W. Blackburn (flowscheme, charts) Oct. 17	33
				Removal of oil and grease from industrial wastewaters. Davis L. Ford & Richard L. Elton (tables, charts, diagrams) Oct. 17	49

NOTES—* Illustrated: (C) Chementator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Controlling sulfur compounds in wastewater. James P. Watkins (charts, flowscheme).....Oct. 17	61	computerized (N).....Dec. 5	84	W.C. Dickinson (chart, diagram).....Jan. 31	*101
Heavy metals removal. Kenneth H. Lanouette (flowschemes, tables, charts).....Oct. 17	73	Dryers & Drying		Federal budget: Carter revises the fiscal '78 budget (C).....Mar. 14	76
Reducing fluoride in industrial wastewater. Edgar G. Paulson (chart, flowscheme).....Oct. 17	*89	Methods for analyzing drying equipment—report (charts, tables, diagrams) (R) Jan. 17	*104	Foreign firms still favoring acquisitions in U.S. (N).....May 23	99
Treatment of phenolic wastes. Kenneth H. Lanouette (diagrams, charts, tables).....Oct. 17	99	How to classify a drying process. F. W. Dittman.....Jan. 17	106	Higher outputs predicted for industrialized nations (N).....July 18	57
Removing particulates from stack gases. Robert C. Lasater & John H. Hopkins (flowschemes, chart).....Oct. 11	111	Establishing the parameters for a spray dryer. F.W. Dittman & E.M. Cook Jan. 17	108	How to make the correct economic decision on spare equipment. Gerald O. Davis (diagrams, tables).....Nov. 21	*187
Removal of SO ₂ from industrial waste gases. Normal Kaplan & Michael A. Maxwell (tables, flowschemes).....Oct. 17	*127	Analyzing suspended-particle dryers with psychrometric charts. D. W. Belcher & others.....Jan. 17	112	Investments in '76 for U.S. manufacturing facilities by companies based abroad (N).....Feb. 28	121
Fugitive hydrocarbon emissions. Donald D. Rosebrook (tables).....Oct. 17	*143	Drying slabs, sheets, and beds. F. W. Dittman.....Jan. 17	118	Japan's chemical production last year was up, but capital investment drops (C).....Apr. 25	28
Nitrogen oxide problems in industry. Robert D. Reed (table, chart).....Oct. 17	153	—Letter.....Nov. 7	5	Overseas capital-spending plans—McGraw-Hill survey (C).....Aug. 29	18
Directory of technical literature.....Oct. 17	159	Vacuum dryers. M. R. Spotts & P. F. Waltrich.....Jan. 17	120	Profit outlook, 1977—McGraw-Hill's Economics Dept. survey (C).....Mar. 28	54
Desulfurization		Organic Recycling's toroidal dryer dries sewage sludge to a soil builder or landfill (C) Aug. 15	87	Profitability studies	
Allied Chemical's fluegas desulfurization based on low-energy membrane electroanalysis (C).....Sept. 12	89	Dust & Fume Handling		I. Putting inflation into profitability studies. F.A. Holland & F.A. Watson (charts, tables).....Feb. 14	87
Flue-gas desulfurization process: Utilities scrub out SO _x . Richard Greene (tables) (N).....May 23	101	Canada: P. V. Containers' process eliminates dusts in handling solid sulfur (N).....Oct. 10	75	II. Project risk, inflation, and profitability.....Mar. 14	133
—Correction (letter).....Oct. 10	5	Cyclone dust collector: How to choose one. Christian Doerschlag & Gerhard Mizek (charts, diagram).....Feb. 14	*64	Program for discounted-cash-flow return on investment. Norman H. Wild (tables) May 9	*137
Flue gas desulfurization to cost U.S. billions—Frost & Sullivan study (N).....Sept. 12	93	—Correction (letter).....July 4	5	R&D Ford Administration's last budget request earmarks \$28 billion for R&D (C).....Jan. 31	56
Japan/U.S. duo set to sock SO ₂ /NO _x (N) Jan. 3	43	Cyclones: New design approach boosts efficiency. Wolfgang H. Koch & William Licht (tables, graphs).....Nov. 7	*80	R&D at work (Ed).....June 20	5
Japan's Ube Industries combines air-pollution control with caprolactam production (C).....June 6	68	Dust filter (type RF) cuts energy requirements.....Oct. 24	*93	R&D spending: Bigger chunk of industrial R&D funds is going to energy production and conversion investigations (C).....Jan. 31	54
KVB, Inc. process is competitor for catalytic hydrosulfurization of fuel oil (C).....Jan. 17	68	Ground-level detector tames flare-stack flames. Thomas R. Schmidt (charts & diagrams).....Apr. 11	*121	R&D spending: Energy crisis making a big impact—McGraw-Hill survey (C).....June 6	68
Lime fluegas-desulfurizing agent output begins (N).....Mar. 28	*70	Measuring pollutants in stack gases (tables, diagrams).....Jan. 31	*90	Rising nationalism: A way to ease out of oil debts? (N).....Dec. 19	33
Standard Oil (Indiana) catalyst cuts SO _x from generators (C).....Apr. 11	71	Tracer-gas system determines flow volume of flue gases. John Knoepke.....Jan. 31	91	Spending for employee safety and health: McGraw-Hill survey (C).....June 6	68
Nonphosphate detergent builder, CMOS, set for U.S. trout (C).....Mar. 28	53	CO ₂ measurements can correct for stack-gas dilution. Harry C. Lord.....Jan. 31	95	Titanium: Outlook for titanium brightens with CPI gains (N).....Dec. 19	*40
Phosphate substitutes: CPI firms aim to clean up with new detergents. Larry J. Ricci (N).....May 23	*104	Dyes & Dyeing	31	U.S. chemical sales—MCA survey (C).....Jan. 3	35
Sugar—A sweet future for sugar products: promising prospects as potential building blocks of many of today's petrochemical products. Philip M. Kohn (N).....Jan. 31	63	Allied sells one of its last two colorant operations to Harmon Colors Corp. (N).....Feb. 14	82	"U.S. Industrial Outlook 1977"—Commerce Dept.: U.S. chemicals to top \$100 billion in '77. Larry J. Ricci (tables) (N) Mar. 28	66
Diatomites—Pressure filtration: Getting the most out of diatomite filteraids. Arthur J. Basso (flowsheet, table).....Sept. 12	*185	Food-dye users see red over color bans. Richard Greene (N).....Jan. 17	84	Editorials	
Dibromochloropropane (DBCP)		Canada and the Common Market do not agree. (N).....Jan. 17	28	Energy policy needs help.....May 9	5
Fumazone and Nemagon may be responsible for male sterility at Occidental (C).....Aug. 15	88	Yellow Dye No. 5 would be banned from some drugs, but not from food (C).....Feb. 14	84	Heavy hand gets heavier.....Aug. 29	5
OSHA prepares emergency temporary standard: Dow and Shell test employees (C).....Sept. 12	90	Identifying and controlling health hazards from dyes: TSCA health-testing costs-sharing (N).....June 20	67	Invitation to the Chem Show.....Nov. 21	5
OSHA's proposed permanent standard (C).....Nov. 21	114	ICI's Procion and Dispersol dyes: continuous dyeing of polyester-cotton blends (C) Sept. 26	41	A lively marketplace.....Feb. 28	5
3,5-dichloroaniline—Ishihara Sangyo Kaisha's Yokkaichi plant: 3,5-dichloroaniline fungicide mass production (C).....June 20	59	Plastics industry's use of colors in '76 (N) Aug. 1	25	Midcourse evaluation.....Aug. 15	5
Diethylstilbestrol—OSHA levies \$34,100 fine against Dawe's Labs, maker of cancer-causing DES (C).....July 4	64	E		1977-78 CEEBG.....July 18	Pt. 2-1
Dilution—Air dilution for sulfuric acid plants. M. A. Beer & J. A. Andrade Leite (chart) (P.N.).....Nov. 21	220	Economics		1977 Special Reports.....Jan. 3	5
Dinitrotoluene—Mitsui Toatsu's toluene dinitrosulfonate process avoids phosgene (C).....Mar. 14	73	Argentina: Denationalization policy (N) Oct. 10	75	Past, present and future.....June 6	5
Diethyl Phthalate—GE chooses diethyl phthalate as a PCB replacement in capacitors (C) Feb. 14	27	Can U.S. firms still compete abroad: tax changes and anti-boycott legislation. Guy E. Weismantel (table) (N).....Aug. 29	25	The regulators.....Sept. 26	5
Dioxin—Italy: Imesa's toxic dioxin contamination, caused by explosion last July, spreads (C).....May 9	87	Capital spending: McGraw-Hill's Economics Dept. survey (N).....Mar. 28	61	R&D at work.....June 20	5
Disaster Control—What to do when disaster strikes-Stardust plant fire—report. Henry E. Webb, Jr. (checklist, map).....Aug. 1	*47	Spring survey of U.S. plans (C).....May 9	86	Specific pollutants control.....Oct. 17	5
Distillation		Business spending plans survey (C).....Nov. 7	43	Story behind the Award.....Dec. 5	5
An approach to multiphase vapor-liquid equilibria. M. J. Leach (charts, diagrams).....May 23	*137	Capital spending: Report reveals CPI growth signals. Richard Greene (table) (N).....Nov. 7	56	Education	
Comparing equilibrium stages with transfer units. Atef Aly Manieh (charts) (P.N.) May 9	163	Capital spending estimates for next year—reports from McGraw-Hill and First Boston Corp. (C).....Nov. 21	112	Dynamic challenges for tomorrow's CPI-report (charts & tables).....June 6	103
Design: Shortcuts for distillation design—report. Otto Frank (tables, graphs, charts, diagrams) (R).....Mar. 14	*110	Capital spending 1977: a cautious upswing. Robert B. Norden (table) (N).....May 23	108	Overview	
Determining ideal stages on a pocket calculator. H. Tan (tables) (P.N.).....Mar. 14	154	Capital spending rates of U.S. CPI could inch upwards in years to come (C).....Oct. 24	71	Future changes in chemical engineering. J.M. Leathers.....June 6	119
Energy-saving schemes in distillation. William C. Peterson & Thomas A. Wells (tables, graphs, flowschemes).....Sept. 26	*78	CPI contractors size up 1977. John C. Davis (charts) (N).....Jan. 3	45	People	
Installed cost of a distillation column. J. S. Miller & W. A. Kapella (charts, tables, diagrams).....Apr. 11	*129	Dynamic challenges for tomorrow's CPI-report (charts & tables) (R).....June 6	*103	Future opportunities favor chemical engineers. Jay Matley.....June 6	150
Plant layout series see under CE Refresher		Overview		Demand for and education of chemical engineers up to 2000. James Cummings-Sutton.....June 6	154
Prediction of liquid activity coefficients. A. K. Rao (tables).....May 9	143	Today's leaders explore tomorrow's challenges—roundtable discussion.....June 6	104	"The Gourman Report: A Rating of American and International Universities." Richard Greene (table) (N).....Oct. 24	88
Drugs		Forecasting and planning. A. Nicholas Filippello.....June 6	114	Learn computer programming the convenient way. Loren F. Hazelwood.....Jan. 3	103
—CE construction alert (R) Mar. 28-114.....Sept. 26	101	Capital		MIT links undergraduate and graduate engineering with internships (C).....Oct. 10	71
Tablet-making plant of Merck Sharp & Dohme is		Sources of capital for growth of process plants. Clifford Neely & Jon E. Browning.....June 6	142	Minority engineers: new effort to increase their representation in graduate schools (N).....Jan. 31	61
		Economic evaluation of future equipment needs. Thane R. Brown (chart & table).....Jan. 17	*125	Women: Chemical engineering schools attracting more women (C).....May 23	93
		Economic penalties of operating a process at reduced capacity. F.A. Holland & F.A. Watson (charts & tables).....Jan. 3	91	Electricity	
		Economics of process heat from solar energy.		Battelle Columbus Laboratories: energy-storage water batteries may supplement peak-load electrical demands (C).....June 20	59

NOTES—*Illustrated: (C) Cimentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Electrolysis Allied Chemical's fluegas desulfurization based on low-energy membrane electrolysis (C) Sept. 12	89	fineries is down 13.6% API report (C) Apr. 25	57	Consequences of regulation: short range . . . long range . . . Borden R. Putnam June 6	158
ERDA funds osmosis and electrolysis studies aimed at wringing energy from salt water (C) Aug. 1	20	R&D spending: energy crisis making a big impact—McGraw-Hill survey (C) . . . June 6	68	OSHA, EPA and plant design. Frank W. Buehner June 6	161
Electrolysis Battelle Columbus Laboratories: energy-storage water batteries may supplement peak-load electrical demands (C) . . . June 20	59	Select pumps to cut energy cost. John H. Doolin (charts, diagram) Jan. 17	*137	Energy see Energy	
Hydrogen processes: Hopes fly high. Philip M. Kohn (N) Mar. 14	86	Strategies for curtailing electric power. Edmund A. Perreault & Paul J. Putzmann (charts & tables) May 33	153	Environmental engineering. Doing away with pollutants wastewater and air DESKBOOK (R) Oct. 17	
Electronics—Allied announces development of photochemical diodes that operate in a manner analogous to photosynthesis (C) . . . Feb. 14	26	Techniques for saving energy in processes add equipment—report (flowsheets, graphs, table) (R)		The Editor's page—Specific pollutants control Oct. 17	5
Electrostatic Enhancement—Electric spark of ionizers hikes scrubber efficiency. Larry J. Ricci (diagrams) (N) Sept. 26	52	Balancing energy costs against equipment costs. S. B. Zdonik July 4	99	Directory of environmental offices and officials (chart) Oct. 17	10
Electrostatic Precipitators Electrostatic precipitator packs a higher charge (charts) Mar. 14	95	Optimizing the ICI low-pressure methanol process. A. Pinto & R. L. Rogerson July 4	102	How to get rid of toxic organics. E. G. Paulson (flowschemes, tables, charts) Oct. 17	21
Electrostatic precipitators in industry. Robert L. Bump (charts, tables, diagrams) Jan. 17	*129	A formaldehyde process to accommodate rising energy costs. C. W. Horner Sept. 12	108	Removal of salts from process waste waters. James W. Blackburn (flowscheme, chart) Oct. 17	33
Employment Demand to perk up for U.S. engineers: Deutsch, Shea & Evans index (N) Mar. 28	70	Equipment-purchasing policies that save energy. Enrique J. Armstrong July 4	110	Controlling sulfur compounds in waste waters. James P. Watkins (charts, flowscheme) Oct. 17	61
Engineer/Scientist Demand Index (N) . . . July 4	69	Energy See also Fuel, specific fuel		Heavy metals removal. Kenneth H. Lanouette (flowschemes, tables, charts) Oct. 17	73
Hiring practices that attract engineers. F. S. Kirkpatrick & Howard W. Rossman July 18	113	Engineering—CPI contractors size up 1977. John C. Davis (charts) (N) Jan. 3	45	Reducing flouride in industrial wastewater. Edgar G. Paulson (chart, flowscheme) Oct. 17	*89
Job outlook: brightest since 1967. Jay Matley (graphs, table) Oct. 10	135	Engineers		Treatment of phenolic wastes. Kenneth H. Lanouette (diagrams, charts, tables) Oct. 17	99
Job outlook: hiring upswing stalls. Jay Matley (charts, table) Feb. 28	209	Alcoholism: How you can help the alcoholic. Allan Lucks May 9	149	Removing particulates from stack gases. Robert C. Lasater & John H. Hopkins (flowschemes, chart) Oct. 17	111
Job outlook shines for this year's college graduates (C) July 4	62	Assn. of Energy Engineers: Engineers concerned about energy matters band together (C) Sept. 26	43	Removal of SO₂ from industrial waste gases. Norman Kaplan & Michael A. Maxwell (tables, flowschemes) Oct. 17	*127
Energy Assn. of Energy Engineers: Engineers concerned about energy matters band together (C) Sept. 26	43	Can U.S. firms still compete abroad? Tax changes and anti-boycott legislation. Guy E. Weismantel (table) (N) Aug. 29	25	Fugitive hydrocarbon emissions. Donald D. Rosebrook (tables) Oct. 17	*143
Battelle Columbus Laboratories: energy-storage water batteries may supplement peak-load electrical demands (C) . . . June 20	59	Checkpoints for a foreign assignment. Sherman K. Okun June 6	189	Nitrogen oxide problems in industry. Robert D. Reed (table, chart) Oct. 17	153
Brainstorming: Comprehensive new energy-conservation program at Allied Chemical. Mark D. Rosenzweig (N) July 4	*74	Chemical engineers in the metals field: the future of metallurgy. John D. Morgan, Jr. & Ralph C. Kirby (charts, flowcharts) June 20	111	Directory of technical literature Oct. 17	159
Calculate enthalpy with a pocket calculator. Raymond T. Schneider (tables) . . . May 23	145	Do a better job of selling your ideas. Eugene Raudsepp 1. Apr. 11-135 2. Apr. 24	133	EPA: Douglas M. Costle proposed as administrator (C) Feb. 28	116
Carter proposes cabinet-level energy dept. (C) Mar. 1	76	Dynamic challenges for tomorrow's CPI—report (charts & tables) (R) June 6	*103	EPA: organonitrogen compounds are future targets (C) July 18	54
CPI firms map strategy for energy-saving plans. Philip M. Kohn (flowscheme) (N) . . . Nov. 7	*49	Overview		EPA: The regulator. (Ed) Sept. 26	5
Coping with costly energy: the international view. Peter R. Savage (N) Aug. 1	27	Today's leaders explore tomorrow's challenges—roundtable discussion June 6	104	Italy: Icmessa's toxic dioxin contamination caused by explosion last July, spreads (C) May 9	8
Dynamic challenges for tomorrow's CPI—report (charts & tables) (R) June 6	*103	Future changes in chemical engineering. J. M. Leathers June 6	119	Midcourse evaluation (Ed) Aug. 15	57
Materials and energy Energy and petrochemical raw materials through 1990. Klaus L. Mar June 6	122	People		Multimedia assessment: an integrated approach to pollution. Eugene E. Berkau & others (flowsheet, tables) Aug. 15	148
Industry outlook for inorganic chemicals. George M. Zapp & William T. Hewitt June 6	128	Future opportunities favor chemical engineers. Jay Matley June 6	150	New Jersey law may have significant impact (C) Mar. 28	54
The effects of water-pollution control on energy consumption. J. I. Stevens & C. L. Kuskik (tables, graphs) Aug. 15	139	Demand for and education of chemical engineers up to 2000. James Cummings-Saxton June 6	154	Pollution control—EPA construction alert (R) Mar. 28	121
Energy options to the year 2000—report. Richard E. Balzhiser (charts & tables) (R) Jan. 3	*72	Education see Education		Pollution control—Inventory of new processes and technology alert (R) Jan. 31	114
Energy policy needs help (Ed) May 9	5	Employment see Employment		42nd inventory Jan. 31	107
ERDA funds osmosis and electrolysis studies aimed at wringing energy from salt water (C) Aug. 1	20	How do you score as a delegator? Marion E. Haynes Sept. 12	179	43rd inventory July 18	107
ERDA study (MOPPS) eyes energy technologies in terms of market, not supply (C) . . . July 4	64	It takes more than engineering talent. Jack M. Vogel Aug. 29	85	Pollution control costs	
ERDA wants new research ideas, reward: \$20,000 (N) Jan. 3	43	Lighten your paperwork load. Lee Grossman Nov. 7	101	Dow: "Excessive" rules cost firm \$50 million/yr. (N) Apr. 11	79
Energy R&D programs presented to Pres. Carter by the TVA (C) Sept. 12	89	Living in the Middle East . . . a wife's view. Joan Schoellner June 20	121	The effects of water-pollution control on energy consumption. J. I. Stevens & C. L. Kuskik (tables, graphs) Aug. 15	139
Energy-saving schemes in operation. William C. Petterson & Thomas A. Wells (tables, graphs, flowschemes) Sept. 26	*78	Play games to spark your creativity. Eugene Raudsepp Sept. 26	109	Environmental protection could cost \$486 billion over the 1975-84 period (C) Jan. 31	55
Geothermal see Geothermal		President's science advisor wants more technicians at regulatory agencies (C) May 9	88	Pollution-control expenditures—McGraw-Hill survey (C) May 23	94
Goodyear's energy "self-help" program pays off: new natural-gas wells in Akron, O. (C) . . . July 18	51	Shortsighted supervisors: victims of the chocolate cream syndrome. David Francis Curran Aug. 1	73	Process and pollution costs, and energy usages, for selected processes. J. I. Stevens & C. L. Kuskik (table) Aug. 15	144
Lockheed says H could provide propulsion and electrical power (N) Aug. 15	93	Some of your manners may not travel well. Allison Hock Nov. 21	211	Swedish study warns if coal- or oil-burning plants were to replace nuclear facilities, there would be a serious health and environmental effects (N) May 9	93
N.J. Energy Research Institute sets out to solve energy problems of the Northeast (C) . . . Feb. 14	27	Speechmaking: Better visuals make speeches better. Merritt G. Marbach (diagrams) Mar. 14	141	White House reorganization leaves technology advisor's office virtually intact, but nearly settles Council on Environmental Quality (CEQ) (C) Aug. 29	20
Ocean thermal energy conversion (OTEC) Sea-borne studies of OTEC may begin by '79 (C) Mar. 14	76	U.S. citizens working abroad get a reprieve on taxes (C) Oct. 10	72	Environment See also Air Pollution; Atomic Power; Noise; Water Pollution	
ERDA contract to TRW to build heat exchangers for an OTEC system (N) . . . Aug. 15	93	What help can you expect when you relocate? Jay Matley Dec. 19	93	Enzymes—Lactase: Forrning's immobilized enzymes may move into cheese whey processing (C) Nov. 7	41
Lockheed's OTEC system (N) Aug. 15	93	What's wrong with engineers' jobs. Jane S. Shaw Jan. 31	123	Equilibrium	
Process design of particulate scrubbers: "contacting power" technique predicts collection efficiency. Konrad T. Semrau (tables, graphs) Sept. 26	87	What makes "professional climate"? John D. Constance Dec. 5	131	An approach to multiphase vapor-liquid equilibria. M. A. Leach (charts, diagrams) May 23	137
Refineries: Energy consumption by U.S. oil refineries is down 13.6% API report (C) Apr. 25	57	Write and present persuasive reports. Douglas W. Hissong July 4	131	Calculating the approach to equilibrium. Carlos R. Duhan (table) Aug. 29	96
		You're as efficient as your files. Jerry Perrich & Ralph I. Elliott Oct. 24	*151	Comparing equilibrium stages with transfer units. Atet Aly Muehich (charts) (P.N.) Mar. 9	163
		Enzymes		Equilibrium constants for water-gas shift reactions. Larry Bisset (tables) (P.N.) Oct. 24	155
		MoS₂ in engine oil dispute (C) May 9	85	More on vaporization and condensation: Equilibrium-flash calculation with the SR-K. Edward Withe (P.N.) Sept. 26	121
		Molybdenum disulfide coming into vogue as a friction modifier (C) Aug. 1	17	Prediction of liquid activity coefficients. K. Rao (tables) May 9	143
		Stirling engine may come into commercial production: Sweden's FFV forms joint venture with Thetford Corp. (C) Apr. 25	57	Shortcuts for distillation design—report. Otto	
		—Correction (letter) July 4	5		
		Synthesized lubricants vie for role in car engines. James H. Prescott (table) (N) June 6	84		
		—Correction (letter) Oct. 10	5		
		Environment			
		California may soften its strict plant-siting requirements (C) Mar. 14	74		
		Carter's environment message (C) July 4	70		
		Dynamic challenges for tomorrow's CPI—report (charts & tables) (R) June 6	*103		
		Government			

NOTES—*Illustrated: (C) Chementator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Frank (tables, graphs, charts, diagrams) (R) Mar. 14	*110	changes at Essochem (C) Nov. 21	113	dedicated (N) Aug. 29	23
Equipment		Common Market licensing proposals come under fire (C) Feb. 28	115	Supply and demand: outlook. John R. Douglas & Charles H. Davis (tables, graphs) July 18	*89
CPI hardware faces longer delivery lags— McGraw-Hill survey (table) (N) June 20	78	Coping with costly energy: the international view. Peter R. Savage (N) Aug. 1	27	U.S. fertilizer production is headed for a "record tonnage year"—FI index (C) July 18	51
Choosing materials for sulfuric-acid services. David W. McDowell July 4	*137	Fiber problems attacked (N) Nov. 21	117	Fertilizers See also specific fertilizer	
Data to estimate equipment capabilities in dif- ferent operations. Thomas C. McKelvey (data sheet) (P.N.) July 4	146	FDA color bans: Canada and the Common Mar- ket don't agree (N) Jan. 17	84	Fibers	
Economic evaluation of future equipment needs. Thane R. Brown (chart & table) Jan. 17	*125	Fluorocarbons-propellant ban not likely to spread to Europe, except in Sweden (C) Jan. 3	36	CE construction alert (R) Mar. 28	120
Hydrocyclones: dimensions and performance. Adam Zanker (charts, diagram) May 9	122	Evaporation—Cooling-water calculations. R. G. Kunz & others (flowscheme, tables, graphs) Aug. 1	61	Courtaulds develops tubular viscose fiber (C) Apr. 11	73
Increased manufacturers' appropriations for new plants and equipment (C) June 20	59	Evaporator—Maxim Distillate Fuel System: draws diesel oil from crude (flowchart) Aug. 1	*39	Du Pont phasing out its Acele acetate fiber business (C) Feb. 14	27
Methods for analyzing drying equipment— report (charts, tables, diagrams) (R) Jan. 17	*104	Explosions		Europeans attack fiber problems (N) Nov. 21	117
How to classify a drying process. F. W. Dittman Jan. 17	106	Air Products' nitrous oxide unit explodes (N) Aug. 29	23	Slump will claim some more casualties (N) Jan. 31	61
Establishing the parameters for a spray dryer. F. W. Dittman & E. M. Cook Jan. 17	108	Avecor Corp. metallized plastics plant explosion (N) Aug. 1	25	World synthetic-fibers growth forecast from ICI (C) May 23	95
Analyzing suspended-particle dryers with psychrometric charts. D. W. Belcher & others Jan. 17	112	H&P Equipment's stainless-steel vat purchased by Fabricolor explodes on loading dock (C) Aug. 15	89	Filing Systems	
Drying slabs, sheets, and beds. F. W. Dittman Jan. 17	118	Union Oil's refinery struck by lightning (N) Oct. 24	77	Lighten your paperwork load. Lee Gross- man Nov. 7	101
Vacuum dryers. M. R. Spotts & P. F. Wal- trich Jan. 17	120	Explosives		You're as efficient as your files. Jerry R. Perrich & Ralph I. Elliott Oct. 24	*151
Systematized failure analysis. R. F. Lee (charts, tables, diagrams) Jan. 3	*107	Swedish study of dynamite workers: New data on heart attacks (N) Mar. 28	61	Filters & Filtration	
Some unusual failure modes Jan. 3	*129	TNT: U.S. Army defuses Tenn. plant (N) Mar. 28	61	Dust filter (type RF) cuts energy re- quirements Oct. 24	*93
How poor design causes equipment fail- ures Jan. 31		Exports		Fuller's baghouse fights pollution in a big way for Armco Steel Sept. 12	*106
Techniques for saving energy in processes and equipment—report (flowsheets, graphs, table) (R) July 4	99	LNG: Trinidad may export LNG to the U.S.— liquefaction plant planned (C) Nov. 7	42	How to increase filtration rates in continuous filters. Frank M. Tiller & Joseph R. Crump (charts, diagrams) June 5	183
Balancing energy costs against equipment costs. S. B. Zdonik July 4	93	Mexico to boost petroleum exports (N) Jan. 31	61	Kraft and Bearlitter to use non-cellulose-acetate membranes for ultrafiltration in cheese pro- duction (N) Sept. 12	93
Equipment-purchasing policies that save en- ergy. Enrique J. Armstrong July 4	110	Saudi Arabian LPG exports to skyrocket (N) June 6	75	Pressure filtration: Getting the most out of diatomite filteraids. Arthur J. Basso (flow- sheet, table) Sept. 12	*185
Equipment See also Process Equipment		Ube's (Japan) cement sails to U.S. (N) Sept. 26	47	Fires	
Ethanol—Brazil: Gasoline substitute-ethanol from sugar cane and manioc (N) Sept. 12	93	Extraction		Union Oil's refinery struck by lightning (N) Oct. 24	77
Ethylbenzene—Mobil/Badger: Better path to ethylbenzene—Kirkpatrick Award Honorable Mention Dec. 5	*120	British push supercritical coal-extraction (N) Aug. 29	23	What to do when disaster strikes—Stardust plant—report. Henry E. Webb, Jr. (check list, map) Aug. 1	*47
Ethylene		Motionless mixers move into new processing roles. Mark D. Rosenzweig (N) May 9	*95	Flame Retardants—Hoechst Fibers' flame resis- tant polyester fiber (Trevira 271) incorporates phosphorus (C) Nov. 7	43
Amoco's twin ethylene unit at Chocolate Bayou, Tex. (C) Oct. 24	73	Recovering uranium from wet-process phos- phoric acid: two processes, DEPA-TOPO and OPAP. Fred J. Hurst & others (flow- sheet) Jan. 3	56	Flotation	
Arco withdraws from joint venture with Du Pont: Centennial Hydrocarbons (C) Oct. 24	73	DEPA-TOPO process (C) Aug. 29	19	GSL's potash flotation process produces sulfate-of-potash fertilizer brine. R. Bruce Tippin (flowcharts) July 18	73
Capacity keeps on building. ARCO Chemical operating unit at Channelview, Tex. (N) Jan. 31	61	Extrusion—Scrapless thermoplastics-forming technique (jet-forming) cuts resin waste by 15% using extrusion technique (C) June 20	60	Mineral processing methods: review and fore- cast. Lawrence A. Roe (flowchart, diagram, table) June 20	*102
Capital spending: Report reveals CPI growth- signals. Richard Greene (table) (N) Nov. 7	56	F		Flour —"Super slurpers": USDA researchers report a boost in distilled-water absorbency (C) Mar. 14	74
Centennial Hydrocarbons options Texas prop- erty for its proposed petrochemicals facility (C) July 4	62	Fatty Acids		Flow	
Dynamic challenges for tomorrow's CPI— report: Materials and energy.		Celanese will build a 40-million-lb/yr synthetic fatty acid plant at its Bay City, Tex. plant (C) Oct. 10-71 (N) Oct. 10	75	Friction-factor equation spans all fluid-flow re- gimes. Stuart W. Churchill Nov. 7	91
Future supply and demand for basic petro- chemicals. Eugene J. Debrenceni (charts) June 6	135	Liquichimica and Emery Industries foresee promising prospects for their new fatty acids (N) Feb. 28	121	Measuring pollutants in stack gases (tables, diagrams) Jan. 31	*90
EPA says Corpus Christi Petrochemical's new ethylene facility won't meet EPA's emissions policy (N) July 4	69	Synthetic-lubricant growth may be hindered says ODC (N) Nov. 7	47	Tracer-gas system determines flow volume of flue gases. John Knoepke Jan. 31	91
Ethylene: the end of an era. James H. Prescott (tables) (N) Mar. 28	63	Feeders —Powdered-coal feeders will undergo de- velopment and testing at Lockheed (C) May 9	87	CO ₂ measurements can correct for stack-gas dilution. Harry C. Lord Jan. 31	95
France: Shell's ethylene cracker to be built by Lummus (N) Aug. 15	93	Fermentation		Selecting sight flow indicators. Roger McDonough July 4	*113
Japanese consortium to build ethylene plant in Singapore (N) Aug. 1	25	DOE's biomass and fermentation programs: liquid fuel production (C) Nov. 7	44	Fluidization —How flow phenomena affect design of fluidized beds. Frederick A. Zenz (charts & tables) Dec. 19	81
Japanese ethylene plant startup completed in three days (C) June 6	67	Sugar—A sweet future for sugar products: promising prospects as potential building blocks of many of today's petrochemical products. Philip M. Kohn (N) Jan. 31	63	Fluids	
Japanese ethylene producers see naphtha shortage (N) June 6	75	Ferro Alloys —Norway-Iceland ferro-alloy joint venture (N) Jan. 17	75	Friction-factor equation spans all fluid-flow regimes. Stuart W. Churchill Nov. 7	91
Monsanto and Conoco sign agreement to build an ethylene plant at Chocolate Bayou, Tex. (C) Nov. 7	43	Ferrosilicon		In-plant bulk materials handling (charts, dia- grams, tables)	
Shell Chemical's ethylene plant at Norco, La. okayed (C) Sept. 26	41	Northwest Alloys to resume production at its Addy, Wash. plant (N) Jan. 17	75	Powder testing techniques for solving indus- trial problems. Eisenhart-Rothe & Peschl Mar. 28	97
Sweden's underground LNG storage system: rock caverns coated with polyurethane (N) Sept. 26	47	Philippines' ferrosilicon plant (N) Jan. 17	75	Systems approach for in-plant bulk mate- rials handling. Schofield & Sutton Mar. 28	103
Techniques for saving energy in processes and equipment-report (flowsheets, graphs, table) (R) July 4	98	Fertilizers		Fluorobates—Method cleans up fluorobate wastes using inexpensive commercial soap (N) Apr. 25	65
UC's "crude-oil cracking" to make ethylene will undergo prototype testing (C) May 9	85	Calculate fertilizer blends by nomograph. Bill Sisson (nomograph, table) (P.N.) Mar. 14	156	Fluorocarbons	
Ethylene Oxide		CE construction alert (R) Mar. 28	111	Chlorofluorocarbons: Searching for ways to control nonpropellant uses. (C) Nov. 7	44
Comes under increasing suspicion of harmful health effects—EPA and OSHA studies (C) July 4	64	GSL's potash flotation process produces sulfate-of-potash fertilizer from brine. R. Bruce Tippin (flowcharts) July 18	73	Fluorocarbon controversy	
Italy to build a surfactant plant in Siberia (N) Nov. 7	47	Letter Oct. 24	162	Fluorocarbons-propellant ban not likely to spread to Europe, except in Sweden (C) Jan. 3	36
UC: 500-million-lb/yr ethylene oxide plant at Taft, La. (N) July 4	69	Production curtailments (C) Feb. 14	27	Manufacture of fluorocarbon propellants would end by Oct. 15, 1978 under a joint proposed regulation (C) May 23	96
2-ethylhexanol—Mitsubishi's expansion of 2-EH capacity using rhodium catalyst (C) Feb. 14	25	Seaweed-based fertilizer dubbed Kelpus (N) Apr. 11	79	Fluorocarbon F-11: "Legionnaire's disease" leads to the first use of the Toxic Substances Act's provision for a "citizen's petition" (C) Jan. 3	38
Europe		South Korea: World's largest fertilizer plant		Fly Ash—Flue-gas-cleaning wastes disposal. Ju- lian W. Jones (map, tables) Feb. 14	*79
Aromatics prices fall: forces benzene-process				Food	
				Cheese: Corning's immobilized enzymes may move into cheese-whey processing (C) Nov. 7	41
				Cheese: Dutch make alcohol from whey (N) Nov. 7	60

NOTES—*Illustrated: (C) Cimentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Cheese: Kraft and Beatrice to use non-cellulose-acetate membranes for ultra-filtration in cheese production (N) . . .	Sept. 12
CE construction alert (R) . . .	Mar. 28
Processed-foods: new processes, equipment and packaging. Philip M. Kohn (N) . . .	Sept. 26
Food Colorants	
FDA color bans: Canada and the Common Market don't agree (N) . . .	Jan. 17
Food-dye users see red over FDA color bans. Richard Greene (N) . . .	Jan. 17
Polymeric food-colorant gains commercial palatability (C) . . .	Feb. 14
Formaldehyde—Techniques for saving energy in processes and equipment—report (flowsheets, graphs, table) (R) . . .	Nov. 7
A formaldehyde process to accommodate rising energy costs. C. W. Horner . . .	July 4
—Letter . . .	Sept. 12
France	
American Can Co. sells M&T Chemicals to Axco Industries (Societe Nationale Elf Aquitaine) (C) . . .	Sept. 26
Shell's ethylene cracker to be built by Lummus (N) . . .	Aug. 15
Uranium: Liquid-phase enrichment of uranium—scientists report (C) . . .	May 23
Fuel	
Additives: Fuel-efficiency thrust ups sales to the CPI. Larry J. Ricci (graph) (N) . . .	Nov. 7
CE construction alert (R) . . .	Mar. 28
—Letter . . .	Sept. 26
Coal see Coal	
DOE's biomass and fermentation programs: liquid fuel production (C) . . .	Nov. 7
Direct iron reduction: the role widens for natural-gas alternatives. Mark D. Rosenzweig (flowchart) (R) . . .	Feb. 28
Dynamic challenges for tomorrow's CPI—report: Materials and energy see Chemical Engineering Reports	
Energy options to the year 2000—report. Richard E. Balzhiser (charts & tables) (R) . . .	Jan. 3
Excessive CO ₂ could cause "greenhouse effect": force limits on fossil-fuel in 50 yrs—NRC study (C) . . .	Aug. 1
Exxon R&D's fuel-oil gun equipped with a motionless mixer cuts atomizing steam consumption (C) . . .	Jan. 3
Feedstocks: Ammonia production—new feeds and processes. Peter R. Savage (flowsheet) (N) . . .	Oct. 24
Feedstocks: Chemical feedstock alternatives—reducing dependence on petroleum (C) . . .	Oct. 24
Feedstocks: Dow announcements (C) . . .	Dec. 5
Feedstocks: Monsanto and Conoco sign agreement to build a feedstocks-processing unit at Lake Charles, La. (C) . . .	Nov. 7
Feedstocks: Petrochemical feedstock alternatives—UC's Perry sees the shift as three-step process (N) . . .	Oct. 24
Garbage-to-fuel facility set for full construction in Newark, N.J. by late 1979 (N) . . .	July 4
Hydrogen: Hopes fly high for new hydrogen processes. Philip M. Kohn (M) . . .	Mar. 14
KVB, Inc. process is competitor for catalytic hydrodesulfurization of fuel oil (C) . . .	Jan. 17
Methanol see Methanol	
Natural gas see Natural Gas	
New processes and technology alert (R) . . .	
42nd inventory . . .	Jan. 31
43rd inventory . . .	July 18
Petroleum see Petroleum	
Rhodium-containing chemical converts sunlight to fuel (N) . . .	Sept. 26
Sugar—A sweet future for sugar products: promising prospects as potential building blocks of many of today's petrochemical products. Philip M. Kohn (N) . . .	Jan. 31
Synthetic fuels: U.S. could be weaned from oil imports through a synthetic-fuels industry (N) . . .	Nov. 7
SNG see Natural Gas	
UC's Brownsville boilers take aqueous wastes as primary fuel (C) . . .	July 4
VPO protects against running out of gas . . .	Aug. 15
Why not burn wood? J. H. Fernandes (diagrams & tables) . . .	May 23
Fuel Cells—Japan's chlor-alkali process switch-over from mercury to diaphragm cells may be delayed (C) . . .	Apr. 11
Fungicides—Ishihara Sangyo Kaisha Ltd.'s Yokkaichi plant: 3,5-dichloroaniline fungicide mass production (C) . . .	June 20
Furfural—Foster Wheeler wins furfural contract to build in Kenya (N) . . .	Sept. 26
Furnaces	
Hazen's new iron carbide process gives steel-makers wider feedstock options (C) . . .	Aug. 15
New routes compete for spent-carbon recovery. Raul Ramirez (table) (N) . . .	Sept. 12
Z-Bloks: Furnace lining system cuts installation time . . .	June 20

G

Gas	
Analyze stack gases via sampling or optically, in place. H. A. Klasens (diagrams, tables) . . .	Nov. 21
Basic-oxygen-furnace offgases may provide high-purity carbon monoxide (C) . . .	Mar. 28
Estimating acid dewpoints in stack gases. Robert R. Pierce (charts, tables) . . .	Apr. 11
Heat-capacity ratios for real gases. Claudio Purarelli (nomograph) (P.N.) . . .	Mar. 14
Measuring pollutants in stack gases (tables, diagrams) . . .	Jan. 31
Tracer-gas system determines flow volume of flue gases. John Knoepke . . .	Jan. 31
CO ₂ measurements can correct for stack-gas dilution. Harry C. Lord . . .	Jan. 31
Petrocarbon's cryogenic separator at Vistron Corp.'s plant in Lima, O. recovers H from ammonia purge gas (C) . . .	Aug. 1
Physical properties of selected gas-streams. V. Ganapathy & others (graphs) . . .	Feb. 28
Gasification	
American Natural Resources and Peoples Gas hoping to build the U.S.'s first commercial-size coal-gasification plant (C) . . .	Mar. 28
Ammonia-from-coal demonstration plant using Texaco process: ERDA and W. R. Grace sign agreement (C) . . .	Sept. 12
Carter Oil (Exxon): considering lignite gasification plant in Texas (N) . . .	July 18
Cities Service's coal hydrogasification process: pilot-plant test to maximize liquid aromatics production (C) . . .	Dec. 5
Coal-conversion: ERDA's demonstration program. John C. Davis (tables) (N) . . .	Oct. 10
The Coalcon project . . .	Oct. 10
Coal gasification goes underground (N) Dec. 5	
Data deficiency hampers coal-gasification plant design. L. C. Yen & others (chart) . . .	May 9
Dow building a prototype unit to produce fuel for turbines (C) . . .	Dec. 5
ERDA looking to test coal gasification for feedstock production (C) . . .	Jan. 31
ERDA's contracts for small coal-gasification applications (N) . . .	May 23
Residuum gasification process: International Materials module of its Segas process will begin three-year test (C) . . .	Apr. 25
Slagging coal gasifier moves to the design stage: ERDA and Conoco will share in costs and income (C) . . .	June 20
Gasifier aims for SNG market. Peter R. Savage (graph, diagram, chart) . . .	Sept. 12
Synthane coal-gasification pilot plant, Bruce-Town, Pa. (C) . . .	Apr. 25
TVA ammonia from coal unit employs Texaco gasification process (C) . . .	June 6
U.S. and Germany form coal-research joint venture (N) . . .	Nov. 7
Gasoline	
Badger's methanol-to-gasoline plant under DOE contract to use Mobil's zeolite catalyst technology (C) . . .	Dec. 5
Dimersol process provides option for nonleaded-gas makers. Philip M. Kohn (flowsheet, tables) . . .	May 23
Gasoline-from-coal plant costs: Fluor's study for DOE (C) . . .	Dec. 5
Inventories up (C) . . .	Feb. 28
Lead-in-gas: U.S. oil refiners grid for lead-gasoline cuts. James H. Prescott (N) . . .	Jan. 31
—Letters Mar. 28-5 . . .	July 18
Methylcyclopentadienyl Manganese Tricarbonyl . . .	
Antiknock may be headed for a legislative ban (C) . . .	Mar. 14
GM backs claim that MMT degrades catalytic converters: Ethyl recommends cutting dosage (C) . . .	July 4
California ban (C) . . .	Aug. 1
Philippines and Brazil look for substitutes (N) . . .	Sept. 12
Phillips' antimony-based passivation system increases throughput and gasoline yield in catalytic crackers (C) . . .	Apr. 11
Volkswagenwerk AG reports on impact of a 15%-methanol gasoline (C) . . .	Feb. 28
Geothermal	
Biphasic Engines' device to win fresh water and electricity from geothermal wells to be tested (N) . . .	Mar. 14
Could hot subterranean magma liberate hydrogen from water? (C) . . .	Nov. 21
Energy options to the year 2000—report. Richard E. Balzhiser (charts & tables) (R) . . .	Jan. 3
"Hot rocks" geothermal power generation project at Los Alamos Scientific Lab., N.M. (C) . . .	Sept. 26
Germany	
BASF's nuclear power plant hopes dim again (C) . . .	Jan. 3
Bayer AG & Degussa: peracid route to propylene epoxidation (C) . . .	June 20
Coal liquefaction: Saarbergwerke to build plant	

(N) . . .	Aug. 1
General Mills sells chemical specialties operations to Germany's Henkel & Cie. (C) . . .	Sept. 26
Naphthalene-based dyestuffs-intermediate plant for Schelde Chemie Brunsbettel GmbH (C) . . .	Sept. 26
North Sea gas goes to market: Ekofisk field to German terminal (C) . . .	Oct. 10
Petroleum refiners plan more light-products-conversion facilities (C) . . .	Jan. 3
Pressure leaching of various low-grade metallic ores, employing a plug-flow "tube digester," will get a pilot-plant tryout (C) . . .	May 23
U.S. and Germany form coal-research joint venture (N) . . .	Nov. 7
Volkswagenwerk AG reports on impact of a 15%-methanol gasoline (C) . . .	Feb. 28
Waste pyrolysis process yields chemical feedstocks (C) . . .	Aug. 29
West Germany: Shale-oil recovery tests (N) . . .	Oct. 10
Glass—Water sampling: Glass particles treated with chelating agents may cut costs (C) . . .	Oct. 24
Glass Fibers	
Ferro Corp. sells fiber-glass operations to Reichhold (C) . . .	June 20
FRP: Owens-Corning Fiberglass' Amarillo, Tex., plant (N) . . .	May 9
Graphite—Arco's motor oil contains graphite particles to cut friction and boost mileage (C) . . .	Aug. 1
Great Britain	
Anglo-Russian methanol deal (C) . . .	June 6
British push supercritical coal-extraction (N) . . .	Aug. 29
Celanese Cytrei process yields cellulose-based tobacco supplement. Mark D. Rosenzweig (flowchart) . . .	June 20
—Letter . . .	Oct. 24
Controls tighten on TDI in the printing industry (N) . . .	Aug. 1
Courtaulds develops tubular viscose fiber (C) . . .	Apr. 11
ICI favors terephthalic acid as preferred precursor to polyester fiber (C) . . .	Mar. 28
Researchers find simple oxygen injection in sewer mains feeding wastewater treatment plants sharply reduces the size and cost of biological treaters (C) . . .	Jan. 31
Rubber and cablemaking workers' cancer risk survey (C) . . .	Jan. 3
Scrap-tire pyrolysis nears commercialization (C) . . .	Nov. 21
Tobacco substitute materials get clean bill of health (C) . . .	Apr. 11
Tobacco substitutes get slow start (N) . . .	Sept. 26
Toxic substances: new control (C) . . .	Jan. 31
the U.K. tries for all metric. Tyler Marshall (N) . . .	Nov. 21
Grinding	
Cryogenic grinding: cold-shouldered by CPI because of its cost. Larry J. Ricci (N) . . .	July 4
A primer on cryogenic size-reduction . . .	July 4
Cryogenic grinding: three developments (N) . . .	Mar. 28
H	
Health	
Alcoholism: How you can help the alcoholic. Allan Luks . . .	May 9
Asthma attacks related to particulate and sulfate levels in air? EPRI says not necessarily (C) . . .	May 23
Cancer see Safety	
Chemicals giving birth to human reproductive woes. Larry J. Ricci (table) (N) . . .	Aug. 1
Our in-the-body chemical factory may be causing worker-ills too . . .	Aug. 1
Meditation: Combat stress with an ancient cost-free therapy. Mary C. Lock . . .	May 23
Spending for employee safety and health: McGraw-Hill survey (C) . . .	June 6
Standard Oil's computer-based health and environmental management system (C) . . .	Sept. 26
Swedish study of dynamite workers: New data on heart attacks (N) . . .	Mar. 28
Swedish study warns if coal- or oil-burning power plants were to replace nuclear facilities, there would be serious health and environmental effects (N) . . .	May 9

NOTES—*Illustrated: (C) Cimentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Health See also Air Pollution, Environment; Labor; Safety; Water Pollution

Heat
Calculate enthalpy with a pocket calculator. Raymond T. Schneider (tables) . . . May 23
Physical properties of selected gas-streams. V. Ganapathy & others (graphs) . . . Feb. 28
Relating heat emission to surface temperatures. V. Ganapathy (nomograph) . . . Dec. 19

Heat Exchangers
ERDA contract to TRW to build heat exchangers for an OTEC system (N) . . . Aug. 15
ERDA evaluating designs for 1-MW heat exchangers (C) . . . Mar. 14
Finding the natural frequency of vibration of exchanger tubes. V. Ganapathy (table, nomograph) (P.N.) . . . Sept. 26
Operating performance of steam-heated reboilers. Albert E. Helzner (diagram, tables) . . . Feb. 14
—Letters . . . Oct. 24
Plant layout series see under CE Refresher
UC's Ozaki quench cooler employed in crude oil cracking process prevents coking on heat exchangers (C) . . . Sept. 26

Heat Transfer
Charts simplify spiral finned-tube calculations. V. Ganapathy (nomographs) . . . Apr. 25
CPI firms map strategy for energy-saving plans. Philip M. Kohn (flowscheme) (N) . . . Nov. 7
Operating performance of steam-heated reboilers. Albert E. Helzner (diagram, tables) . . . Feb. 14
—Letters . . . Oct. 24
Physical properties of selected gas-streams. V. Ganapathy & others (graphs) . . . Feb. 28
Tubeside heat-transfer. P. D. Kulkarni & P. S. Phadke (P.N.) . . . Feb. 14

Heaters
Immersion heaters: Heat more efficiently—with electric immersion heaters. David R. Martignon (charts, table) . . . May 23
Solar water-heater. Daljit Singh & R. S. Chauhan (chart, diagram) (P.N.) . . . Feb. 14

Heating
Carbodontum's more-chemical-resistant SiC heating-bar element for electric heating in chemical processing (C) . . . Nov. 7
Economies of process heat from solar energy. W. C. Dickinson (chart, diagrams) . . . Jan. 31
Heat Engineering makes world's largest electric heater for Dowtherm heat transfer fluid . . . Aug. 29
Microwave technology: penetrating CPI markets. Philip M. Kohn (N) . . . Jan. 3
—Correction Mar. 14-5 . . . Mar. 28
Operating and maintenance records for heating equipment. Edgar C. Sharp, Jr. Pt. I Apr. 25-141 . . . Pt. II May 23
Solar energy for process heat: cost must drop (N) . . . Nov. 21
Hydrides—Metals find new role as hydrogen reservoirs. John C. Davis (flowscheme) (N) . . . Sept. 12
Hydrogen sponges: what they are, how they work . . . Sept. 12

Hydrocarbons
Arco withdraws from joint venture with Du Pont: Centennial Hydrocarbons (C) . . . Oct. 24
Beaded carbon ups solvent recovery. Purasiv HR system (diagram) . . . Aug. 29
Environmental engineering DESKBOOK see DESKBOOKS

EPA considers proposals for air-pollution tradeoffs: CPI agreements with other companies (C) . . . July 18
Hydrocyclones: dimensions and performance. Adam Zanker (charts, diagram) . . . May 9

Hydrogen
Could hot subterranean magma liberate hydrogen from water? (C) . . . Nov. 21
Hopes fly high for new hydrogen processes. Philip M. Kohn (N) . . . Mar. 14
Hydrogen recovery unit ups NH₃-plant efficiency. Roy Banks (flowscheme, table, graph) . . . Oct. 10
Lockheed says H could provide propulsion and electrical power (N) . . . Aug. 15
Metal powders as hydrogen "sponges" may find use in gas purification and energy systems (C) . . . June 20
Metals find new role as hydrogen reservoirs. John C. Davis (flowscheme) (N) . . . Sept. 12
Hydrogen sponges: what they are, how they work . . . Sept. 12
Petrocarbon's cryogenic separator at Vistron Corp.'s plant in Lima, O. recovers H from ammonia purge gas (C) . . . Aug. 1
Rhodium-containing chemical converts sunlight to fuel (N) . . . Sept. 26
Water-gas shift reaction takes place at 95° using a new catalyst: hydrogen producing reaction (C) . . . July 18
Hydrogen Peroxide—Bayer AG & Degussa: peracid route to propylene epoxidation (C) . . . June 20

Hydrogen Sulfide—Monsanto Enviro-Chem introduces sulfuric acid plants designed specifically to use H₂S from coke-oven gas (C) . . . Mar. 14
Hydrothermal—Energy options to the year 2000—report. Richard E. Balzhiser (charts & tables) . . . Jan. 3

I

Imports
Goodyear signs deal for Japanese tirecord (C) . . . Feb. 28
LNG: import program may slow down. Raul Ramirez (N) . . . Oct. 10
Oil: U.S. could be weaned from oil imports through a synthetic-fuels industry (N) Nov. 7

Incineration
Hooker Chemicals garbage incinerator at Niagara Falls, N.Y. scheduled for 1979 (C) . . . July 4
How sludge characteristics affect incinerator design. R. G. Novak & others (chart, tables, diagrams) . . . May 9
Kepone: Midland-Ross incineration trials (N) . . . Feb. 14-31
Thermal incinerators for U.S.S.R. (N) . . . May 9

Inorganic Chemicals
CE construction alert (R) . . . Mar. 28
New processes and technology alert (R) . . . Sept. 26
42nd inventory . . . Jan. 31
43rd inventory . . . July 18

Instruments
Ground-level detector tames flare-stack flames. Thomas R. Schmidt (charts & diagrams) . . . Apr. 11
Harwell Labs: Ultrasonic metering device tackles process tasks and flow measurement (C) . . . July 18
Indicators: Cutting costs with more expensive temperature indicators. S. Raghavachari . . . Dec. 19
In-plant slurry handling—report (charts, tables, diagrams) (R) . . . Apr. 25
3. Instrumentation for slurry systems. Nicholas J. Poulis & David Silvermetz . . . Apr. 25
Instrumenting a plant to run smoothly. Norman Lieberman (flowschemes) . . . Sept. 12
Recorders handle more inputs . . . Mar. 28
Savings with standardized thermowells. S. Raghavachari (P.N.) . . . Apr. 11
Selecting sight flow indicators. Roger McDonough . . . July 4

Insulation
Cost effective thermal insulation—report. Michael R. Harrison & Charles M. Pelanne (tables, graphs) . . . Dec. 19
The cost of missing pipe insulation. Rene Cordero (charts) . . . Feb. 14
Quick calculations for piping insulation. V. Ganapathy (chart) (P.N.) . . . Nov. 21
Insurance—Product liability: on the verge of reform. Richard Greene (N) (table) . . . Dec. 5
Intermediates—Naphthalene-based dyestuffs: intermediate plant for Schelde Chemie Brunsbüttel GmbH (C) . . . Sept. 26
Ionizers—Electric spark of ionizers hikes scrubber efficiency. Larry J. Ricci (diagrams) (N) . . . Sept. 26

Iran
Japan and Iran drop four plants from their Bandar Shahpur project slate (C) . . . Nov. 7
Revised five-year plan (C) . . . Jan. 31

Iron
Direct reduction
Direct iron reduction: the role widens for natural gas alternatives. Mark D. Rosenzweig (flowchart) (N) . . . Feb. 28
Sponge-iron process combines flexibility, low costs. Franco Colautti & Alessio Barbi (flowsheet, table) . . . Apr. 25
Iron Carbide—Hazen's new iron carbide process gives steelmakers wider feedstock options (C) . . . Aug. 15
Isocyanates—Arco announces a new non-phosgene route to polymeric isocyanates (C) . . . Oct. 24
Isopropanol—Shell Oil's facility passes medical checkup (C) . . . Oct. 10

Italy
Cancer deaths result in jail sentences for IPCA officials (C) . . . July 4
Icmesa's toxic dioxin contamination, caused by explosion last July, spreads (C) . . . May 9
Liquichimica renews hopes for its single-cell protein investment (C) . . . Feb. 28
Single-cell protein industry: findings on SCP safety good; government-imposed shut-down of one partially operating SCP plant, and the delay of startup of another (C) . . . Apr. 25

J

Japan
Admantane: process employing new isomerization catalyst (C) . . . Jan. 31
Asahi-Dow's route to ionomer resin (C) . . . Oct. 24
Chemical production last year was up, but capital investment drops (C) . . . Apr. 25
Chlor-alkali process switchover from mercury to diaphragm cells may be delayed (C) . . . Apr. 11
Coping with costly energy: the international view. Peter R. Savage (N) . . . Aug. 1
Decentralizing industrial capacity (N) . . . Aug. 1
Desalting plant for the Red Sea (C) . . . June 20
Ethylene plant startup completed in three days (C) . . . June 6
Ethylene producers see naphtha shortage (N) . . . June 6
Exxon's Flexicoking process for converting asphalt to clean fuel oil used in Toa Oil unit (N) . . . Jan. 17
Gas centrifuges gain in U-enrichment (N) . . . Jan. 3
Harnessing ocean waves for power (N) . . . Sept. 12
Ishihara Sangyo Kaisha Ltd.'s Yokkaichi plant: 3,5-dichloroaniline fungicide mass production (C) . . . June 20
Japanese consortium to build ethylene plant in Singapore (N) . . . Aug. 1
Mitsubishi's expansion of 2-ethylhexanol capacity using rhodium catalyst (C) . . . Feb. 14
Mitsui Petrochemical's plant will make m-toluidine and m-cresol by amination with ammonia (C) . . . Jan. 17
Mitsui Toatsu's diisocyanate process avoids phosgene (C) . . . Mar. 14
Nissan's synthetic route to myrcene, based on isoprene feedstock, nears commercialization (C) . . . Aug. 15
Petroleum refiners have oversupply of sulfur (N) . . . Aug. 15
Platform-mounted pulp plant gets set to sail. Richard Greene (diagram) (N) . . . Aug. 29
Process yields aldehydes and alcohols via oxidation of toluene derivatives (C) . . . July 4
Reverse osmosis uses Teijin's new membrane—PBIL polymer (C) . . . Oct. 24
Senboku Polymer's ash-less, solvent-less polypropylene process (C) . . . May 9
Ube Industries combines air-pollution control with caprolactam production (C) . . . June 6
Ube's cement sails to U.S. (N) . . . Sept. 26
UC's Ozaki quench cooler employed in crude oil cracking process prevents coking on heat exchangers (C) . . . Sept. 26
U.S./Japanese duo set to sock SO₂/NO_x (N) . . . Jan. 3
Uranium: New adsorbent to obtain the atomic fuel from low-grade ores (N) . . . June 20
Uranium from the sea research program (C) . . . Apr. 11

K

Kilns—Screw-conveyor kiln challenges rotary-drum units . . . May 23

L

Labor
Alcoholism: How you can help the alcoholic. Allan Luks . . . May 9
Cancer
Acrylonitrile: Du Pont textiles plant in Camden, S.C. carcinogenicity study (C) June 6
California requires registration of cancer causing materials by July 1 (C) June 20
EPA determines several classes of chemicals with high risk of carcinogenicity or mutagenicity (C) . . . June 20
Ethylene oxide comes under suspicion (C) . . . July 4
Great Britain: Rubber and cablemaking workers' cancer risk survey (C) . . . Jan. 3
Italy: cancer deaths result in jail sentences for IPCA officials (C) . . . July 4
Methylene chloride study indicates no evidence of cancer in test animals (N) June 6
N.J. plans major study on cancer deaths (C) . . . Jan. 3
New York: carcinogens in drinking water (N) . . . Oct. 24

NOTES—*Illustrated: (C) Chementator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Nitrites and nitrosamines: Multiagency action could begin soon (C)	Aug. 29	20	damage suit (N)	Feb. 14	31	Systematized failure analysis, R. P. Lee (charts, tables, diagrams)	Jan. 3	*107
Shell Oil's isopropanol facility passes medical checkup (C)	Oct. 10	71	Tax Reform Act of 1976: Will new tax laws save or cost you money? Jay Matley	Mar. 28	125	Some unusual failure modes	Jan. 3	*107
UC's South Charleston, W.Va. VCM plant: former employee fifth victim of liver cancer (C)	July 18	52	Toxics see Toxics			How poor design causes equipment failures	Jan. 31	*129
Chemicals giving birth to human reproductive woes, Larry J. Ricci (table) (N)	Aug. 1	30	Leaching			V-belt problems and solutions, Graham W. Howard (tables, diagrams)	Aug. 15	157
Our in-the-body chemical factory may be causing worker-ills too	Aug. 1	34	Holmes & Narver's ore-leaching process cuts water pollution—under construction in Santiago, Chile (C)	July 18	53	Wear and galling can knock out equipment, W. J. Schumacher (tables)	May 9	165
Discrimination: Common Market adopts non-discriminatory code (N)	Oct. 10	75	Pressure leaching of various low-grade metallic ores, employing a plug-flow "tube digester," will get a pilot-plant tryout (C)	May 23	93	Maleic Anhydride—Japanese-U.S. pair evaluate new acrylonitrile/maleic process (C)	Feb. 28	113
Dynamic challenges for tomorrow's CPI—report (charts & tables) (R)	June 6	*103	Lead			Management		
Government			Lead-in-gasoline see Gasoline			Alcoholism: How you can help the alcoholic, Allan Lukis	May 9	149
Consequences of regulation: short range... long range... Bordon R. Putnam	June 6	158	Lead levels in paint must drop to 0.06% by June '77 (C)	Jan. 17	70	Bechtel leases office building in Houston (C)	Sept. 26	43
OSHA, EPA and plant design, Frank W. Buehner	June 6	161	OSHA's revised limit for lead in the work-place hearing (C)	Jan. 17	70	CPI and government: The regulators (Ed)	Sept. 26	5
OSHA			Leather—Dry-cleanable leather: new treatment called PolyRetanning, Vincent Cavaseno technique	Sept. 12	104	FMC reorganizes its lines of business under nine groups (C)	May 23	96
Actions spawn a new trade group—the American Industrial Health Council (C)	Dec. 5	67	From animal skins to leather—an ancient technique	Sept. 12	104	Heavy hand gets heavier (Ed)	Aug. 29	5
Benzene standards see Benzene			Liquefaction			How do you score as a delegator? Marion E. Haynes	Sept. 12	179
Bingham, Eula proposed as administrator of OSHA (C)	Feb. 28	116	Exxon oil-from-coal route gets fueled (N)	Mar. 14	81	How to achieve effective project control, Robert A. King (charts, graphs, tables)	July 4	117
Cadmium-exposure standards: OSHA changes its standards-setting procedure (C)	Feb. 14	28	Exxon's donor-solvent coal liquefaction process will get pilot-plant tryout under ERDA agreement (C)	Aug. 15	89	Is caring about people a lot of hogwash? William T. Scherer	Feb. 14	93
Dawe's Labs, maker of DES, fined \$34,100 (C)	July 4	64	Germans to try coal liquefaction: Saarbergwerke to build plant (N)	Aug. 1	25	It takes more than engineering talent, Jack M. Vogel	Aug. 29	85
Idaho Court ruling casts doubt on OSHA job-site inspection authority (C) Jan. 17	Jan. 17	69	Materials challenges of coal liquefaction, J. B. O'Hara & others (chart, table)	Apr. 11	*147	Management by exception in operations and maintenance, W. H. Weiss	Dec. 5	151
Identifying and regulating carcinogens in the workplace: comprehensive policy proposed (C)	Feb. 14	28	Trinidad may export LNG to the U.S.: liquefaction plant planned (C)	Nov. 7	42	Meditation: Combat stress with an ancient cost-free therapy, Mary C. Lock	May 23	167
CPI asks for slow look at new policy (N)	Mar. 14	81	U.S. and Germany form coal-research joint venture (N)	Nov. 7	47	Shortsighted supervisors: victims of the chocolate ice cream syndrome, David Francis Curran	Aug. 29	73
Categories for suspected materials (C)	Oct. 24	74	Liquids			Some of your manners may not travel well, Allison Hock	Nov. 21	211
Lead in the workplace: revised limit hearing (C)	Jan. 17	70	An approach to multiphase vapor-liquid equilibria, M. J. Leach (charts, diagrams)	May 23	137	Train, Russell E., elected director of Union Carbide N.Y.C. (N)	Aug. 29	23
Nickel: OSHA considers reducing workday exposure following NIOSH report (C)	Oct. 10	72	Estimating the holdup in dish heads, V. Ganapathy (nomograph) (P.N.)	Feb. 14	108	What help can you expect when you relocate? Jay Matley	Dec. 19	93
OSHA moving to balance health and safety—report	Apr. 11	*108	Prediction of liquid activity coefficients, A. K. Rao (tables)	May 9	143	What makes a "professional climate"? John D. Constance	Dec. 5	147
Pt. I OSHA—Where it stands, where it's going, William P. Demery	Apr. 11	*110	Lubrication			Manganese—Manganese-nodule exploitation: Lockheed-managed effort is new entry (C)	Jan. 17	67
Pt. II A comprehensive approach to occupational safety and health, Ralph M. Gelburd	Apr. 11	*114	Arco's motor oil contains graphite particles to cut friction and boost mileage (C)	Aug. 1	17	Materials		
Pt. III Industrial hygiene control methods, Richard F. Scherberger	Apr. 11	*118	Celanese predicts healthy growth for synthetic lubricants (C) Oct. 10-71, (N) Oct. 10	Oct. 10	75	Choosing materials for sulfuric-acid services, David W. McDowell	July 4	*137
Redirection to focus on more-serious problems (N)	June 20	67	Exxon's new mileage-boosting motor oil: Uniflo premium mineral oil (C)	Sept. 12	88	Clathrates, new materials freeze and thaw at room temperature (C)	Aug. 1	72
Ruptured vessel spurs scalding water over workmen at Monsanto's styrene facility (C)	Dec. 5	67	MoS ₂ coming into vogue as a friction modifier (C)	Aug. 1	17	Coatings: How corrosion theory relates to protective coatings, Dean M. Berger (tables, diagrams) I. Aug. 1-77, II. Aug. 29	Aug. 29	*89
Safeguarding against shock hazards, Russell C. W. Crom (diagrams)	Mar. 28	*90	MoS ₂ engine oil dispute (C)	May 9	85	—Letter	Oct. 24	162
Shell Chemical's ex-employee files health-damage suit (N)	Feb. 14	31	Refined oil can perform as well as virgin lube oil says ERDA (C)	July 4	63	Dynamic challenges for tomorrow's CPI—report: Materials and energy see Chemical Engineering Reports		
Shell Oil testing lube dewaxing for possible cause of nerve disease (N)	Jan. 17	75	Synthesized lubricants vie for role in car engines, James H. Prescott (table) (N) June 6	June 6	84	Fire resistance—how to test for it, William A. Rains (charts & table)	Dec. 19	97
Spending for employee safety and health: McGraw-Hill survey (C)	June 6	68	—Correction (letter)	Oct. 10	5	Materials challenges of coal liquefaction, J. B. O'Hara & others (chart, table)	Apr. 11	*147
Swedish study of dynamite workers: New data on heart attacks (N)	Mar. 28	61	Synthetic-lubricant growth may be hindered says ODC (N)	Nov. 7	47	Materials Technology Institute of the Chemical Process Industries, Inc.'s organizational meeting (C)	Mar. 14	74
Toxic Substances Control Act see Toxics			Uniflo's new lubricants: polymerization produces polyalphaolefin—can replace PCBs (N)	July 18	57	Outdoor bulk storage for hydrophilic materials, Jesse C. Z. Ku & Denis Bevan (tables, diagrams, graphs)	Aug. 29	*69
Labor See also Employment						Scrubbers: Halt corrosion in particulate scrubbers, Thomas G. Gleason (flowcharts)	Oct. 24	*145
Law						"Super slurpers": USDA researchers report a boost in distilled-water absorbency (C)	Mar. 14	74
Agency for Consumer Advocacy could play a big role in rulemaking processes of other U.S. regulatory bodies (C)	Apr. 25	60	Magnesium—NL Industries' Utah magnesium plant has become fully operational (C)	Dec. 5	66	Systematized failure analysis, R. P. Lee (charts, tables, diagrams)	Jan. 3	*107
Argentina: Denationalization policy (N)	Oct. 10	75	Maintenance			Some unusual failure modes	Jan. 3	*107
Can U.S. firms still compete abroad: tax changes and anti-boycott legislation, Guy E. Weismantel (table) (N)	Aug. 29	25	All-maintenance firms clean up in the CPI, Mark D. Rosenzweig (N)	Dec. 5	*78	How poor design causes equipment failures	Jan. 31	*124
Carbonated-drink packs: FDA tests and rulings, Richard Greene (N)	July 18	59	Dimensional variations on centrifugal pumps: effects, Fred Busch (diagrams)	Sept. 26	93	Volatile corrosion-inhibitors in CPI services, Boris A. Miksic (diagrams, graph, table)	Sept. 26	115
Celanese employee found guilty of selling polyester-film trade secrets (C)	May 23	94	Estimating the costs of steam leaks using a "steam piccolo," Jack Goyette (P.N.) Aug. 29	Aug. 29	103	Wear and galling can knock out equipment, W. J. Schumacher (tables)	May 9	155
Discrimination: Common Market adopts non-discriminatory code (N)	Oct. 10	75	Finding and fixing hot pump bearings, Robert Shields	Dec. 19	131	Zinc-rich primers: Applicator's guide, Dean M. Berger (charts)	Mar. 14	*147
Energy see Energy			In-plant vs. contract maintenance, Eric M. Bergstraun	Mar. 28	117	Materials Handling		
Environmental see Air Pollution; Environment; Waste Disposal; Water Pollution; Water Supply			Installing and maintaining V-belts, Graham W. Howard (table, diagram)	July 18	117	In-plant bulk materials handling (charts, diagrams, tables)		
Environmental engineering DESKBOOK see DESKBOOKS			Management by exception in operations and maintenance, W. H. Weiss	Dec. 5	151	Powder testing techniques for solving industrial problems, Eisenhart-Rothe & Peschl	Mar. 28	97
Federal regulation writers face new hurdles (C)	Nov. 7	44	Operating and maintenance records for heating equipment, Edgar C. Sharp, Jr. Pt. I Apr. 25-141, Pt. II	Apr. 25	171	Systems approach for in-plant bulk materials handling, Schofield & Sutton Mar. 28	Mar. 28	103
Government funding to cover legal and expert-witness fees incurred by private groups at government hearings, endorsed (N)	May 9	93	Plastic centrifugal pumps for corrosive services, Ed Margus (table)	Feb. 28	213	Solids: Methods for conveying and weighing solids (charts, tables, diagrams)	Feb. 28	176
Heavy hand gets heavier (Ed)	Aug. 29	5	Plant layout series see under CE Refresher			Designing for batch and continuous weighers, J. R. Mitchell	Feb. 28	177
Italy: Cancer deaths result in jail sentences for IPCA officials (C)	July 4	62	Pumps: Diagnosing troubles of centrifugal pumps, S. Yedidia (tables, graph diagrams) Part I Oct. 24 *124, Part II Nov. 21-193, Part III	Dec. 5	141	Using helical screws for solids handling, L. Bates	Feb. 28	183
OSHA see Labor			Savings with standardized thermowells, S. Raghavachari (P.N.)	Apr. 11	160	Materials Technology Institute of the Chemical Process Industries, Inc.'s organizational meeting (C)	Mar. 14	74
Pesticides regulation see Pesticides						Mathematics		
Product liability: on the verge of reform, Richard Greene (N) (table)	Dec. 5	*73				An approach to multiphase vapor-liquid equilibria, M. J. Leach (charts, diagrams)	May 23	137
Shell Chemical's ex-employee files health-								

NOTES—*Illustrated: (C) Cumentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Calculating the required tension on V-belts. Bill Sisson (nomograph) (P.N.)	May 9	164
Calculation of J functions by a pocket calculator. H. Tan (charts) (P.N.)	Oct. 24	158
Chart's simplify spiral finned-tube calculations. V. Ganapathy (nomograph) (P.N.)	Apr. 25	117
Comparing equilibrium stages with transfer units. Atef Aly Manieh (charts) (P.N.)	May 9	163
Cooking-water calculations. R. G. Kunz & others (flowscheme, tables, graphs)	Aug. 1	61
Design and analysis of industrial experiments. Thomas D. Murphy, Jr. (charts, tables)	June 6	168
Economic evaluation of future equipment needs. Thane R. Brown (chart & table)	Jan. 17	125
Estimating acid dewpoints in stack gases. Robert R. Pierce (charts, tables)	Apr. 11	125
Estimating costs and weights of process vessels. P. S. Phadke & P. D. Kulkarni (nomograph) (P.N.)	Apr. 11	157
Estimating the holdup in distillation heads. V. Ganapathy (nomograph) (P.N.)	Feb. 14	108
Finding the natural frequency of vibration of exchanger tubes. V. Ganapathy (table, nomograph) (P.N.)	Sept. 26	122
Friction-factor equation spans all fluid-flow regimes. Stuart W. Churchill	Nov. 7	91
How to convert decimals to the nearest fraction. D. L. Russell (table) (P.N.)	Aug. 1	83
More on vaporization and condensation. Equilibrium-flash calculations with the SR-56. Edward Withee (P.N.)	Sept. 26	121
New plot enhances value of batch-thickening tests. Eli Barnes (tables, graphs)	Aug. 29	75
Project risk, inflation, and profitability. F. A. Holland & F. A. Watson (charts)	Mar. 14	133
Quick calculations for piping insulation. V. Ganapathy (chart) (P.N.)	Nov. 21	219
A quick way to figure slurry densities. V. Ganapathy (P.N.)	July 4	144
Recovery calculation for a separation process. Mark C. Anderson	Dec. 19	106
A rhyme for differentiating fractions. Dave Fuji (P.N.)	Apr. 11	160
Trigonometry's chief ratios. Robert Lemlich (P.N.)	Oct. 24	156
Tube-side heat-transfer. P. D. Kulkarni & P. S. Phadke (P.N.)	Feb. 14	108
Measurements		
Adding dimensions in English units. Mark J. Zaremba (charts) (P.N.)	Nov. 21	222
Analyze stack gases in place, optically. H. A. Klusens (diagrams, tables)	Nov. 21	201
Conductivity measurement: what it is, how it works. Michael J. Polla (charts)	Sept. 12	161
Harwell Labs: Ultrasonic metering device tackles process tasks and flow measurement (C)	July 18	53
How to design a metering system. G. R. Balasubramanian & K. Sivasanakan (flowscheme)	Aug. 29	96
In-plant slurry handling—report (charts, tables, diagrams) (R)	Apr. 25	94
1. Pipeline design for industrial slurries. A. J. Carleton & D. C. H. Cheng	Apr. 25	95
2. Slurry pump selection and application. J. Ingemar Dalstad	Apr. 25	101
3. Instrumentation for slurry systems. Nicholas J. Poulis & David Silvermetz	Apr. 25	107
Measuring pollutants in stack gases (tables, diagrams)	Jan. 11	90
Tracer-gas system determines flow volume of flue gases. John Knoepke	Jan. 31	91
CO ₂ measurements can correct for stack-gas dilution. Harry C. Lord	Jan. 31	95
Selecting sight flow indicators. Roger McDonough	July 4	113
Membranes		
Japan's chlor-alkali process switchover from mercury to diaphragm cells may be delayed (C)	Apr. 11	71
Kraft and Beatrice to use non-cellulose-acetate membranes for ultrafiltration in cheese production (N)	Sept. 12	93
Reverse osmosis uses Teijin's new membrane—PBIL polymer (C)	Oct. 24	72
Mercury—Japan's chlor-alkali process switchover from mercury to diaphragm cells may be delayed (C)	Apr. 11	71
Meta refer to particular compound		
Metallurgy		
Chemical engineers in the metals field: the future of metallurgy. John D. Morgan, Jr. & Ralph C. Kirby (charts, flowcharts)	June 20	111
Copper: New Cu-winning cell thrives on slurries (N)	Jan. 31	72
Motionless mixers move into new processing roles. Mark D. Rosenzweig (N)	May 9	95
Pressure leaching of various low-grade metallic ores, employing a plug-flow "tube digester" will get a pilot-plant tryout (C)	May 23	93
Metals		
CE construction alert (R)	Mar. 28	115
Chemical engineers in the metals field: the future of metallurgy. John D. Morgan, Jr. & Ralph C. Kirby (charts, flowcharts)	June 20	111
Cryogenic grinding for metals recovery. Larry J. Ricci (N)	July 4	71
A primer on cryogenic size-reduction. July 4		72
Environmental engineering DESKBOOK see DESKBOOKS		
Holmes & Narver's ore-leaching process cuts water pollution—under construction in Santiago, Chile (C)	July 18	53
Metal powders as hydrogen "sponges" may find use in gas-purification and energy systems (C)	June 20	61
Metals find new role as hydrogen reservoirs. John C. Davis (flowscheme) (N)	Sept. 12	98
Hydrogen sponges: what they are, how they work	Sept. 12	98
New processes and technology alert (R)	Jan. 31	110
42nd inventory	July 18	102
Volatile corrosion-inhibitors in CPI services. Boris A. Miksic (diagrams, graph, table)	Sept. 26	115
Meters		
Turbine flowmeter has no bearings	Dec. 5	91
Harwell Labs: Ultrasonic metering device tackles process tasks and flow measurement (C)	July 18	53
UV photometer measures organic compound concentrations in a fluid stream	Sept. 12	111
Methane—DOE's biomass and fermentation programs: liquid fuel production (C)	Nov. 7	44
Methanol		
Anglo-Russian methanol deal (C)	June 6	67
Badger's methanol-to-gasoline plant under DOE contract to use Mobil's zeolite catalyst technology (C)	Dec. 5	67
Davy Powergas and Mitsubishi to cooperate in marketing methanol plants on sea-going barges (N)	Feb. 28	121
Methanol should become a high-volume industrial and commercial fuel by early 1980s (C)	Oct. 24	73
Techniques for saving energy in processes and equipment—report (flowsheets, graphs, table) (R)		
Optimizing the ICI low-pressure methanol process. A. Pinto & P. L. Rogerson	July 4	102
Volkswagenwerk AG reports on impact of a 15% methanol gasoline (C)	Feb. 28	115
Methylcyclopentadienyl Manganese Triocarbonyl		
Antiknock may be headed for a legislative ban (C)	Mar. 14	76
GM backs claim that MMT degrades catalytic converters: Ethyl recommends cutting dosage (C)	July 4	61
California ban (C)	Aug. 1	17
Mexico		
Natural gas from Mexico via a pipeline (C)	Aug. 15	89
Petroleum exports to be boosted (N)	Jan. 31	61
Microwave		
Microwave technology: Penetrating CPI markets. Philip M. Kohn (N)	Jan. 3	50
—Correction	Mar. 14	5
Watertek, six-step, wastewater treatment system uses microwaves (flowchart)	Jan. 31	77
Middle East—Living in the Middle East—a wife's view. Joan Schoellner	June 20	121
Minerals—Mineral processing methods: review and forecast. Lawrence A. Roe (flowchart, diagram, table)	June 20	102
Mixers & Mixing—Motionless mixers move into new processing roles. Mark D. Rosenzweig (N)	May 9	95
Models—Design and analysis of industrial experiments. Thomas D. Murphy, Jr. (charts, tables)	June 6	168
Molybdenum Disulfide		
Coming into vogue as a friction modifier (C)	Aug. 1	17
Dispute over MoS ₂ in engine oil (C)	May 9	85
Myrcene—Japan: Nissan's synthetic route to myrcene based on isoprene feedstock, nears commercialization (C)	Aug. 15	87
N		
Nahcolite—Superior Oil's process wins oil, minerals from shale (N)	Apr. 25	65
Naphtha		
Ethylene: the end of an era. James H. Prescott (tables) (N)	Mar. 28	61
Japanese ethylene producers see naphtha shortage (N)	June 6	75
Naphthalene—Naphthalene-based dyestuff, intermediate plant for Schelde Chemie Brunsbüttel GmbH (C)	Sept. 26	43
Natural Gas		
Alaskan pipelines		
FPC splits in deciding the best arctic gas pipeline route (C)	May 23	96
Gas shortages may fuel fresh debate over an Alaskan-gas pipeline route (C)	Jan. 31	53
Ammonia from coal as natural gas prices rise. David Netzer & James Moe (flowsheet, graph, tables)	Oct. 24	129
Ammonia production: new feeds and processes. Peter R. Savage (flowsheet) (N)	Oct. 24	79
Amoco's cold-bed adsorption technique ups efficiency of sulfur recovery from sour gas (C)	Mar. 28	55
Carter Oil (Exxon): considering lignite gasification plant in Texas (N)	July 18	57
Direct iron reduction: the role widens for natural-gas alternatives. Mark D. Rosenzweig (flowchart) (N)	Feb. 28	128
Energy options to the year 2000—report. Richard E. Balzhiser (charts & tables) (R)	Jan. 3	72
ERDA study (MOPPS) eyes energy technologies in terms of market, not supply (C)	July 4	64
Gasification see Gasification		
Goodyear's energy "self-help" program pays off: new natural-gas wells in Akron, O. (C)	July 18	51
Iran's revised five-year plan (C)	Jan. 31	54
LNG: First Indonesian shipment of LNG leaves Bontang plant (C)	Aug. 15	88
LNG: import program may slow down. Raul Ramirez (N)	Oct. 10	86
LNG: Sweden's underground LNG storage system: rock caverns coated with polyurethane (N)	Sept. 26	47
LNG: Trinidad may export LNG to the U.S.—liquefaction plant planned (C)	Nov. 7	42
Natural gas from Mexico via a pipeline (C)	Aug. 15	89
Nitrogen as natural gas substitute: carburizing system and N-based system (N)	June 20	67
North Sea gas goes to market: Ekofisk field to German terminal (C)	Oct. 10	70
Shortages in the U.S. CPI (C)	Jan. 31	53
Shortages pose sometimes severe operating difficulties in the U.S. (C)	Feb. 14	25
SNG: Slagging gasifier aims for SNG market. Peter R. Savage (graph, diagram, chart)	Sept. 12	108
UC plans to reduce natural-gas fuel to about 10% of purchased fuel by 1985 says W. R. van der Hooven (C)	Sept. 26	42
U.S. reserves—Estimates (C)	May 23	93
VPO protects against running out of gas. Aug. 15		111
New Products and Services		
1976's Top twenty—A look back	Jan. 3	59
Equipment		
Absorber, gas scrubber/absorber	Sept. 12	210
Accumulator/transfer unit	Oct. 10	100
Actuators	Aug. 29 '40	21
Additive system	Nov. 18	78
Air eliminators	Mar. 14 '63	80
Air-filtering module	Aug. 1	42
Air filtration system	Mar. 14	161
Alarms	Feb. 14-48, June 6-92	15
Analyzer/recorder monitors sodium concentration	Mar. 14	96
Analizers	Feb. 28 '152, Feb. 28-156, Mar. 14 '164, Apr. 11-94, Apr. 11-96, Apr. 11-174, Apr. 25-155, May 23-120, July 4-84, July 15-99, July 18-80, Aug. 1 '42, Sept. 12 '211, Sept. 26 '64, Oct. 10-98, Nov. 7 '68	92
Annunciator, panel	Feb. 14	50
Backstop prevents shaft reversal	July 4	84
Bagger, fertilizer	Apr. 25	84
Baghouse	July 18	78
Bags, gas-sampling	Mar. 28	80
Batcher, chemical	Feb. 28	150
Bearings, slide	Jan. 17	90
Bellows, welded metal	Feb. 28	149
Blenders	Feb. 28 '230	36
Blowdown system	July 18	129
Blowers	Apr. 11 '175, June 20-84	20
Boiler burns coal, oil, gas and wastes	Dec. 19	47
Boxes, pre-dewatering	Mar. 14	160
Cabinet, chart	Sept. 26	130
Cable, heat	Aug. 29	44
Calculators	July 18 '82, Aug. 29 '42, Nov. 7 '9-108	66
Calibrators	Feb. 28-233, Apr. 25-82, May 9-108	66
Centrifuge's, heavy-duty	Jan. 17	161
Chiller, water	Aug. 29	40
Chlorinator, gas	July 4	88
Chromate recovery system	Feb. 28	156
Chromatograph, gas	Feb. 28	150
Clamp, hose	Mar. 14	160
Classifier catches fine particulates	Nov. 21	133
Classifier, primary	Oct. 10	96
Cleaning machine	Nov. 21	134
Compass, Bow	Oct. 10	96
Compressors	May 9 '110, June 6 '89, June 6 '94, June 20-84, July 18 '127	94
Computer, desk-top	Mar. 28 '82	88
Computer, moisture, uses microprocessor technology	Apr. 11	94
Computer control service	June 6	90
Connectors, pressure	June 6	92

NOTES—*Illustrated: (C) Cimentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Container, bulk	Jan. 17	90
Container, plastic	Dec. 5	160
Control system: microprocessor-based supervisory control system	Feb. 28	154
Controllers Feb. 14 *50, June 6-215, June 20 *86, Aug. 28-44, Sept. 12 *114, Sept. 26 *130, Oct. 10 *100, Nov. 7-68, Nov. 7		*116
Controls Feb. 28 *156	Aug. 1	*42
Converters: signal-converters/alarms	Aug. 15	*116
Conveyors Feb. 28-150, Mar. 28-84, Aug. 1 *44	Sept. 26	66
Coolers Mar. 14-98, May 9-110	July 18	127
Counter, tablet	Mar. 28	*94
Couplings May 9 *112	June 6	*96
Covers, drum July 4-159	Dec. 5	*96
Crossbridge spans pipes and conveyors	June 6	*90
Cyclone, liquid	Aug. 15	*114
Data acquisition system offers remote reading of process variables	May 23	*124
Detectors Jan. 17 *159, Feb. 14 *48, Mar. 28-82, Apr. 11-96, Apr. 11 *98, Apr. 25 *86, May 9-112, June 6-94	Oct. 24	*98
Dewpoint cell	Aug. 1	*44
Dispensers, chemical	June 20	*88
Dispensing unit	Mar. 28	*82
Doorway barrier, vinyl	Dec. 5	92
Drive, pneumatic final	Mar. 14	161
Drum, plastic	July 18	*78
Drum handler	Dec. 5	*160
Drum-storage racks	Oct. 24	*98
Dryer, tray	Nov. 21	136
Ducting, flexible	Aug. 15	114
Dust collectors Apr. 11 *96, July 4-86, Oct. 10-98	Dec. 5	*94
Dust filter (Type RF)	Oct. 24	*93
Earmuff, dielectric	July 4	*158
Electrodes, self-cleaning	July 18	78
Electrostatic precipitators	Sept. 12	233
(charts)	Mar. 14	96
Evaporator (Maxim Distillate Fuel System) draws diesel oil from crude (flowchart)	Aug. 1	*39
Feed system, automatic	Sept. 12	*116
Feeders Feb. 14-52, Feb. 28 *149, Mar. 28-84, Apr. 11-172, June 20-84, July 18-82	Aug. 1	*44
Felt, refractory	Sept. 26	130
Filter assemblies	Sept. 12	112
Filter cartridges Apr. 25-86	May 23	*122
Filter material Mar. 14 *98	Apr. 11	94
Filter plates	July 4	86
Filter tubes handle viscous fluids	Feb. 28	*150
Filters Jan. 17-94, Feb. 28-234, Mar. 14 *98, Apr. 25-84, May 23-120, June 20-84, Sept. 26 *66, Sept. 26-68, Oct. 24 *96, Nov. 21-226	Dec. 5	161
Filtration method	July 18	82
Fittings July 18-80, Aug. 29 *40	Oct. 10	151
Flange	Nov. 7	66
Flow-sampling system	Feb. 14	48
Flowmeters Mar. 28 *145, Mar. 28 *146, Apr. 11-94, Apr. 25 *154, May 9-108, May 9-110, May 23-190, June 20-88, July 4-84, Sept. 12-112, Sept. 1 *216, Nov. 21 *226	Dec. 5	96
Freeze-drying chamber, bulk	Sept. 26	66
Gage protectors	Jan. 17	94
Gages Jan. 17-90, Feb. 28 *233, Mar. 14-96, Mar. 14 *161, May 23-191, June 6 *92, June 6-215, June 20-86, July 4-86, July 18 *78	Sept. 12	*112
Glasses, protective	Oct. 10	*96
Grinding mill Apr. 25 *84	Dec. 5	*161
Hand truck, drum	Nov. 7	*117
Heat exchangers Jan. 21-78, Mar. 14 *165, July 4-84	July 18	*82
Heat transfer coils	June 6	217
Heaters Jan. 17-90, Jan. 17-160, Apr. 11 *90	Jan. 17	98
Helmet filters out dust from air	Jan. 17	*90
Hoist, personnel	July 18	131
Homogenizer	Sept. 12	*116
Hose Feb. 28-152	July 4	81
Hydrocyclones	Sept. 12	214
Indicators Jan. 17-90, Feb. 28 *152, Feb. 28-236, Apr. 25 *155, May 23 *120, June 20 *88, July 18-131, Aug. 29 *42	Dec. 5	*96
Instrument-enclosure, heated	Feb. 28	156
Insulation Apr. 25-84, Apr. 25 *154, June 6-215	Oct. 24	94
Jetting system, liquid	Oct. 24	*98
Joints, expansion Jan. 17-160	Sept. 26	68
Kiln: Screw-conveyor kiln challenges rotary-drum units	May 23	*119
Ladder, fiberglass	Aug. 15	179
Lifter, vacuum sheet	Aug. 29	44
Light-curing system	Apr. 24	*98
Lights, inspection	Nov. 21	116
Linings July 18-78, Sept. 12-116	Sept. 12	213
Liquid measurement-system	Jan. 31	*82
Liquid sensing system	Oct. 10	100
Membrane, ultrafiltration	Jan. 17	158
Meters Jan. 31-80, Jan. 31 *82, Feb. 14-50, Feb. 28 *154, Mar. 14-96, Mar. 28-82, Apr. 25 *155, May 23 *190, June 20 *86, July 4-86, July 4-157, July 4-159, July 18-129, Aug. 15 *112, Aug. 29 *42, Sept. 12 *214, Nov. 7 *117	Nov. 21	*226
Meters: Densitometer, hydrocarbon	Sept. 12	*213

Meters: Dosimeter, organic vapor	Aug. 15	179	
Meters: Hygrometers Feb. 14-52	July 18	80	
Meters: Manometer	Aug. 15	*116	
Meters: Micromanometers	Feb. 28	*234	
Meters: Pyrometers June 6 *92	Oct. 10	*150	
Meters: Refractometer sharpens concentration measurement	Oct. 24	*98	
Meters: Turbine flowmeter has no bearings	Dec. 5	*91	
Meters: UV photometer	Sept. 12	*111	
Metric plotter	May 23	191	
Milk crumbler	Mar. 14	100	
Mill, laboratory	Sept. 12	*112	
Minicomputer, stack-gas	Feb. 28	*233	
Mist collector	Dec. 5	*92	
Mixers Jan. 17 *92, Feb. 28-236, Apr. 11-94, Apr. 11-172, Sept. 26-68	Nov. 7	66	
Monitors Feb. 14-48, Feb. 14-52, Feb. 28 *149, Feb. 28 *154, Mar. 14-98, Apr. 25 *86, May 9 *110, May 23-122, May 23-126	June 6-90, June 6-215, June 20-86, July 4-88, July 4 *160, Aug. 1 *40, Aug. 29-42, Oct. 10 *98, Oct. 24-98, Nov. 7 *66, Nov. 21 *138	Dec. 5	94
Motors Mar. 14 *98	Feb. 14	80	
Noise-control material	June 6	90	
Nozzle, multi-jet	Dec. 5	*92	
Nozzles, tank cleaning Feb. 28 *236	Oct. 24	*96	
Odor control unit	Sept. 12	216	
Odor-removal system, activated-carbon	Feb. 14	*47	
Offices, plant	Aug. 15	*179	
Oil skimmers May 23-122	Sept. 12	*114	
Oil/water-splitter snags emulsified oil (flow diagram)	July 18	77	
Ovens Mar. 28 *144, June 20-88, Aug. 1 *42	Sept. 12	*114	
Ozonator, mobile	Nov. 7	*117	
Packing May 23-122, July 4-157, July 18 *78	Oct. 24	*94	
Packing support	Jan. 17	*92	
Pallets Sept. 12-114	Sept. 26	66	
Pens, disposable, fit circular recorders	June 20	*84	
Pipe, fluoroplastic	Sept. 26	*68	
Pipe and fittings, Kynar	Nov. 21	*138	
Pipe drilling device	Nov. 21	*136	
Pipe hanger	July 18	*78	
Piping systems Feb. 14 *92	Apr. 25	*82	
Pipeline strainers	Jan. 17	*158	
Plastic spheres May 23 *124	Dec. 5	*96	
Plugs, fusible	Mar. 28	80	
Press, mechanized filter	Sept. 12	*210	
Pressure pilot	Jan. 17	159	
Pressure test-plugs	Feb. 28	*156	
Process, Powder Jet, slices through thick metal sheets	Apr. 11	*93	
Pumps Jan. 3-94, Jan. 3-114, Jan. 17-94, Jan. 17-114, Feb. 14 *52, Feb. 28-156, Feb. 28 *230, Feb. 28 *231, Feb. 28-236, Mar. 14-96, Mar. 14 *100, Mar. 14-164, Mar. 28 *144, Mar. 28 *146, Apr. 25 *155, May 23-120, June 6 *92, June 20-84, June 20-86, June 20-88, July 4-84, July 4-88, July 18-78, July 18 *80, July 18-126, July 18-127, Aug. 1-40, Aug. 15-116, Sept. 12 *112, Sept. 12 *211, Sept. 26 *66, Oct. 10-98, Oct. 10-150, Oct. 10-151, Oct. 24-96, Nov. 7 *68, Nov. 7 *70, Nov. 21 *134, Nov. 21-136, Dec. 5-92, Dec. 5-94	Dec. 5	96	
Purasive HR system: beaded carbon ups solvent recovery (diagram)	Aug. 29	*39	
Purifier, air	Dec. 5	92	
Readouts, thermocouple	July 18	126	
Recorders Mar. 28 *79, Apr. 25 *84, May 9 *108, May 9 *110, June 6 *94, June 20-88, Aug. 15 *116, Sept. 26 *63, Oct. 10-96, Oct. 10-150	Nov. 7	66	
Reference junction	Jan. 17	92	
Regulators Jan. 17-158, Jan. 17-161, Apr. 11 *96, Apr. 11 *172, Aug. 1-40, Oct. 10-98	Oct. 24	*96	
Respirator, backpack	Oct. 10	*98	
Roof cooling system	Mar. 28	84	
Rupture disk	Apr. 25	86	
Safety shields Feb. 28 *230	June 6	94	
Sampler, portable	Feb. 14	48	
Sampling line	Jan. 17	158	
Scaler, electronic	Sept. 26	64	
Scales Apr. 25-82	July 18	82	
Scanner, thermocouple	Sept. 12	211	
Screens June 6-214	Aug. 15	*114	
Scrubbers June 6-215, Sept. 12-210	Nov. 7	*65	
Scrubbers: Charged scrubber snags submicron particles (diagram)	May 9	107	
Sealants, soft	Oct. 24	94	
Sealer, bag	Aug. 29	40	
Scales Mar. 20-80, May 9 *112, May 23-122	Aug. 1	*44	
Sensors Jan. 17-92, Feb. 28-150, Apr. 25-152	Nov. 21	158	
Separators Feb. 28-152, Apr. 11 *174, Nov. 21 *136	Dec. 5	*161	
Settler, inclined plate	Nov. 7	*70	
Sightglass has a built-in light	Apr. 25	*82	
Signal delay, analog	Oct. 24	96	
Slide rule, circular: is metric converter	Aug. 15	*114	
Smoke detector	Sept. 26	*68	

Spray gun	Dec. 5	*94	
Steam trap	Jan. 31	*80	
Stopwatch, digital	Sept. 26	*60	
Strainers May 23-124	June 6	*90	
Switches July 4 *86, July 18-129, Aug. 1-44, Aug. 29 *44	Oct. 10	100	
Tank-blanketing system	Feb. 28	152	
Tank saddle	July 4	84	
Tanks July 4-84	July 4	88	
Tape-wrapping tool	Apr. 11	*98	
Tele/Pointer helps solve distant problems	Nov. 7	*70	
Test chamber	Sept. 26	*130	
Thermometers Mar. 28 *82, Mar. 28-145, Apr. 11 *172, Apr. 25-82, May 23-120, Sept. 12-112, Nov. 7 *66	Nov. 7	*117	
Totalizer	Aug. 15	114	
Transducer, pressure	July 18	*131	
Transfer unit: Accumulator/transfer unit	Oct. 10	*100	
Transmitters Jan. 341 *80, June 6-215	July 18-126	Dec. 5	94
Traps Aug. 29-42	Oct. 10	98	
Tube-mill, vibrating	Jan. 17	*92	
Tubing, lined	Jan. 17	161	
Valve actuators Feb. 28 *231	Aug. 1	*40	
Valves Jan. 17 *159, Feb. 14-50, Feb. 28-154, Feb. 28 *233, Mar. 14 *100, Mar. 28 *84, Mar. 28 *146, Apr. 11 *174, Apr. 25 *86, May 9-112, June 6-214, July 4-158, July 18-127, Aug. 1-42	Oct. 10	95	
Valves, ball Feb. 28 *154, May 23 *122, June 6-94, July 4 *159, July 18 *127	Nov. 7	*116	
Valves, butterfly Jan. 17 *94, Feb. 14-50, Nov. 7 *117	Nov. 21	*134	
Valves, check May 9-108	Sept. 12	*116	
Valves, control Jan. 31 *80, Mar. 28-144, Apr. 11 *96, Apr. 11 *172, June 6 *94, (diagram), July 4-83	Sept. 12	*114	
Valves, gate Jan. 17 *94, July 4-158	July 18	*80	
Valves, globe May 9 *112, Aug. 29-44	Oct. 10	36	
Valves, shutoff Jan. 3 *113, Feb. 28, 156	Aug. 29	*40	
VFO protects against running out of gas	Aug. 15	*111	
Vibration-monitoring system	May 23	190	
Video display unit aids process control	Jan. 31	*78	
Wash spray, eye/face	Sept. 12	*116	
Wastewater aeration system produces small bubbles	Apr. 25	*81	
Wastewater system uses microwaves (flow-sheet)	Jan. 31	77	
Wastewater treatment system	Aug. 1	44	
Water-screen media	Feb. 14	50	
Water softener	Aug. 15	*112	
Weigh-feeder, continuous	Apr. 25	*152	
Welder, plastics	Aug. 15	*112	
Z-Blocks: Furnace lining system cuts installation time	June 20	*83	
her products and services			
Additive, boiler-water	Oct. 10	96	
Additive, deep-well	Mar. 28	80	
Additive, paint	Mar. 28	144	
Additive, scale-control	Mar. 14	160	
Amergy 5000: Additive saves fuel oil, reduces air pollution (table)	Jan. 17	*89	
Biocide, fuel-oil	Feb. 28	234	
Boiler service Jan. 31-80	May 23	122	
Boiler treatment	Aug. 15	112	
Calendar, linear	Nov. 7	*116	
Caps, protective, identify visitors	Nov. 21	*133	
Casting service	Oct. 24	94	
Chart, conversion	Nov. 7	116	
Cleaning service, pipeline	Nov. 7	70	
Coating, paper	Jan. 3	114	
Coating, refractory	Sept. 26	68	
Coating vehicle	Jan. 31	78	
Core material	Apr. 11	175	
Detergent formulation	Apr. 11	175	
Fiber glass cloth	Oct. 10	100	
Fiberglass shelter house	Dec. 5	*94	
Flame retardant	Apr. 11	98	
Hat, hard	Jan. 31	*82	
Inhibitors, corrosion	Jan. 17	94	
Inhibitors, scale	Nov. 7	117	
Lubricant, yarn anti-stat	Jan. 3	113	
Paint: Security paint system	Mar. 28	144	
Petroleum data system	Aug. 1	40	
Polymers, fluid-based	June 6	214	
Procurement service	Jan. 3	112	
Program, optimization	July 18	78	
Reducing agent	July 18	129	
Resins Sept. 26-64	Oct. 24	96	
Reverse-osmosis element	Feb. 14	50	
Sludge dewatering system	Nov. 7	68	
Surfactants Jan. 31-78	Aug. 1	108	
Sweetener, artificial	Mar. 14	96	
Symbols, process graphic	Oct. 10	96	
Titanium alloys, kit identifies	Aug. 29	*44	
Viscosity testing unit	Nov. 7	*66	
Water treatment	July 4	157	
Nickel—OSHA considers reducing workday exposure to nickel following NIOSH report on nickel and cancer (C)	Oct. 10	72	
Nitrates—Multiagency action against nitrates and nitrosamines could begin soon (C)	Aug. 29	20	
Nitric Acid			
Gulf Oil Chemicals to replace 12 plants at			

NOTES—*Illustrated: (C) Chemticator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Pittsburg, Kan. with one big one (C) Nov. 21	112	and oxygen generators as a source of aircrew oxygen (N) June 20	67	Feedstocks: Phillips' oil-well blowout in the North Sea causes no problem in meeting feedstock needs for plants in the U.K. (C) May 9	87
Selecting oxidation in sulfuric and nitric acid plants: current practices, R. C. Mandelik & W. Turner (chart, table, flowsheet) Apr. 25	123	UC dedicates world's largest air separation plant at Burns Harbor, Ind. (N) Sept. 12	93	Iran's revised five-year plan (C) Jan. 31	54
Nitrogen		Oxygenation		Japan and Iran drop four plants from their Bandar Shahpur project slate (C) Nov. 7	42
EPA: organonitrogen compounds are future targets of pollution control (C) July 18	54	Oxygenation of aqueous wastes: the PROST system. Donald F. Othmer (flowscheme) June 20	117	OSHA: Redirection to focus on more-serious problems (N) June 20	67
Fertilizer supply and demand: outlook, John R. Douglas & Charles H. Davis (tables, graphs) July 18	89	Radox Wastewater Treatment process cuts organics. Philip M. Kohn (flowscheme, graphs) Aug. 15	108	Petro Expo '77: A lively marketplace (Ed) Feb. 28	5
Natural-gas substitute: carburizing system and N-based system (N) June 20	67	Ozone—Ultraviolet light enhances ozonization of organics dissolved in wastewater in Westgate Research Corp's system (C) Aug. 1	18	Highlights of exhibits Feb. 28	141
Peru: Air Products slates world's highest-altitude nitrogen plant (C) Aug. 29	19			New products and services Feb. 28	169
Nitrogen Oxide				Russian contracts with Technip and Eurotechnica (C) Jan. 17	68
Environmental engineering DESKBOOK see DESKBOOKS				Saudi Arabia: Exxon and Basic Industries move closer to joint venture (N) Apr. 25	65
EPA sees its sights on nixing CPT's NO _x emissions. Larry J. Ricci (tables) (N) (R) Pt. 1 Feb. 14-33, Pt. 2 Apr. 11 '84, Pt. 3 Apr. 25	70			Petroleum	
Nitrogen Trifluoride—Air Products and Chemicals: Nitrogen trifluoride by direct synthesis—Kirkpatrick Award Honorable Mention Dec. 5	116			Alaskan oil lines	
Nitrosamines—Multiagency action against nitrates and nitrosamines could begin soon (C) Aug. 29	20			Arco-Trans Mountain agreement would pipe excess Alaskan North Slope crude oil to North Central U.S. refineries (C) Mar. 28	56
Nitrous Oxide—Air Products' nitrous oxide unit explodes (N) Aug. 29	23			Where will North Slope oil go? Guy E. Weismantel (maps) (N) Mar. 14	83
Noise, Control—Industrial noise levels study (N) Apr. 25	65			Arco's motor oil contains graphite particles to cut friction and boost mileage (C) Aug. 1	17
Nylon—Luxembourg: Monsanto to cut output at nylon plant (N) Oct. 24	77			Boiler-fuel slurries of 50/50 coal and oil make economic sense at large installations—GM study for DOE & EPRI (C) Nov. 7	41
				CE construction alert (R) Mar. 28-118, Sept. 26	105
				Chemical feedstock alternatives: reducing dependence on petroleum (C) Oct. 24	72
				China's "surprising discoveries" boost estimates of oil reserves (C) Oct. 10	69
				Energy options to the year 2000—report. Richard E. Balzhiser (charts & tables) (R) Jan. 3	72
				Energy see also Energy	
				Enhanced oil recovery proving successful (N) May 9	93
				Environmental engineering DESKBOOK see DESKBOOKS	
				Evaporator (Maxim Distillate Fuel System) draws diesel oil from crude (flowchart) Aug. 1	39
				Exxon: Winning more from heavy oils—Kirkpatrick Award Honorable Mention Dec. 5	118
				Exxon's Flexicoking process for converting asphalt to clean fuel oil used in Japan's Toa Oil unit (N) Jan. 17	75
				Exxon's new mileage-boosting motor oil: Uniflo premium mineral oil (C) Sept. 12	88
				Fuel-oil supplies seem to be holding up (C) Jan. 31	53
				Imports: U.S. could be weaned from oil imports through a synthetic-fuels industry (N) Nov. 7	47
				KVB, Inc. process is competitor for catalytic hydrodesulfurization of fuel oil (C) Jan. 17	68
				LPG: Saudi Arabian LPG exports to skyrocket (N) June 6	75
				LPG: Stiffer design specifications for LPG tanks improve safety (C) July 18	52
				Mexico to boost petroleum exports (N) Jan. 31	61
				New processes and technology alert (R)	
				42nd inventory Jan. 31	112
				43rd inventory July 18	104
				Offshore oil—Exxon's offshore Calif. plan: Commission seeking to void alternative plan (C) Jan. 3	37
				Oil spills	
				EPA system takes a shot at small oil spills (N) Feb. 14	31
				Phillips' oil-well blowout in the North Sea causes no problem in meeting feedstock needs for plants in the U.K. (C) May 9	87
				Oil/water splitter snags emulsified oil (flow diagram) July 18	77
				Refineries & refining	
				Abu Dhabi: ADNOC embarks on refinery and chemicals venture (N) Oct. 10	75
				Air Products & Chemicals' catalytic cracking regeneration promoter (C) Apr. 11	71
				Alaska: Royalty board accepting proposals to build near Valdez (C) July 18	51
				Amoco Texas Refining plans refinery expansion (N) May 9	93
				Atlantic Richfield's Philadelphia refinery distillate-oil tanks fire (C) Feb. 14	25
				Chevron research's hydro-cracking catalyst, plus a processing scheme enables refiners to more easily shift the output ratio of the products (C) Apr. 11	73
				Crude-oil cracking gains. John C. Davis (table, flowchart) (N) June 6	78
				Crude-oil cracking wins a new convert—Dow Chemical (C) Dec. 5	65
				Designing parallel-plates separators. Julio G. Miranda (charts, diagrams) Jan. 31	105
				Diesel-powered-cars to fuel higher refinery costs (N) June 6	75
				Dimersol process provides option for non-leaded-gas maker. Philip M. Kohn (flowsheet, tables) May 23	114
				Energy Co.'s oil refinery at North Pole, Alaska draws crude from the trans-Alaska pipeline (C) Sept. 12	88
				Energy consumption by U.S. oil refineries is down 13.6%—API report (C) Apr. 25	57
				Exxon's catalyst (RT-621) upgrades heavy	

NOTES—*Illustrated: (C) Chemtator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

residues and crudes (N)	Oct. 24	77	Alaskan oil lines			start, while Seadock is delayed by stiff license terms (C)	Aug. 15	88
FCC units get crack catalysts. John C. Davis (N)	June 6	77	Arco-Trans Mountain agreement would pipe excess Alaskan North Slope crude oil to North Central U.S. refineries (C)	Mar. 28	56	Peru: Air Products slates world's highest-altitude nitrogen plant (C)	Aug. 29	19
German petroleum refiners plan more light-products-conversion facilities (C)	Jan. 3	36	Where will North Slope oil go? Guy E. Weismantel (maps) (N)	Mar. 14	*83	Platform-mounted pulp plant gets set to sail. Richard Greene (diagram) (N)	Aug. 29	30
Japan's petroleum refiners have oversupply of sulfur (N)	Aug. 15	93	Coal-slurry pipelines: drought raises political headaches (C)	Mar. 14	75	Plant Notebook		
Mobil Oil plans refinery expansion (N) May 9		93	Coal-slurry pipelines: economics look good (C)	Oct. 10	71	Adding dimensions in English units. Mark J. Zaremba (charts)	Nov. 21	220
Monsanto and Conoco sign agreement to build a feed-stocks processing unit at Lake Charles, La. (C)	Nov. 7	43	The cost of missing pipe insulation. Rene Cordero (charts)	Feb. 14	*77	Adjusting pH with acid or caustic. F. Caplan (nomograph)	July 4	143
Motionless mixers move into new processing roles. Mark D. Rosenzweig (N)	May 9	*95	FRP piping: Tips on FRP piping. L.S. Surtees & P. Rooney	Nov. 21	215	Air dilution for sulfuric acid plants. M.A. Beer & J.A. Andrade Leite (chart)	Nov. 21	220
Oil refineries: small is in, big is out. James H. Prescott (tables) (N)	Oct. 10	80	Friction-factor equation spans all fluid-flow regimes. Stuart W. Churchill	Nov. 7	91	Basic data for steam generators—at a glance V. Ganapathy (charts)	June 6	197
Phillips' antimony-based passivation system increases throughput and gasoline yield in catalytic crackers (C)	Apr. 11	71	In-plant slurry handling—report (charts, tables, diagrams) (R)	Apr. 25	94	Calculate fertilizer blends by nomograph. Bill Sisson (nomograph, table)	Mar. 14	156
Phillips modernizing and expanding its Sweeny, Tex., refinery (N)	Dec. 5	71	1. Pipeline design for industrial slurries. A.J. Carleton & D.C.H. Cheng	Apr. 25	95	Calculating the approach to equilibrium. Carlos R. Duhne (graph)	Aug. 29	96
Standard oil (Indiana) catalyst cuts SO _x from generators (C)	Apr. 11	71	2. Slurry pump selection and application. J. Ingemar Dalstad	Apr. 25	*101	Calculating the required tension on V-belts. Bill Sisson (nomograph)	May 9	164
Union Oil's refinery struck by lightning (N)	Oct. 24	77	3. Instrumentation for slurry systems. Nicholas J. Poulis & David Silvermetz	Apr. 25	107	Determining ideal stages on a pocket calculator. H. Tan (tables)	Mar. 14	154
U.S. and Germany form coal-research joint venture (N)	Nov. 7	47	Metallic coating from Intertec strengthens specialty piping (C)	Feb. 28	114	Equilibrium constraints for water-gas shift reactions. Larry Bisset (tables)	Oct. 24	155
U.S. oil refiners grid for lead-in-gasoline. James H. Prescott (N)	Mar. 28	5	Natural gas from Mexico via a pipeline (C)	Aug. 15	89	Estimating the costs and weights of process vessels. P.S. Phadke & P.D. Kulkarni (nomograph)	Apr. 11	167
—letter	July 18	5	North Sea gas goes to market: Ekofisk field to German terminal (C)	Oct. 10	70	Estimating the holdup in dish heads. V. Ganapathy (nomograph)	Feb. 14	108
Refined oil can perform as well as virgin lube oil says ERDA (C)	July 4	63	Plant layout series see under CE Refresher			Finding and fixing hot pump bearings. Robert Shields	Dec. 19	103
Reserve program proceeds on schedule (C)	Aug. 29	19	Pressure-relief valves for process plants. Robert Kern (charts, tables, diagrams)	Feb. 28	*187	Finding the natural frequency of vibration of exchanger tubes. V. Ganapathy (table, nomograph)	Sept. 26	122
Reserves: Proved domestic-crude-oil reserves—API report (C)	Apr. 25	57	Quick calculations for piping insulation. V. Ganapathy (chart) (P.N.)	Nov. 21	219	Heat-capacity ratios for real gases. Claudio Furarelli (nomograph)	Mar. 14	153
Stockpiling moves closer to reality (N)	May 9	93	Rapid sizing of vessel nozzles for safety-valve service. R.P. Willis (P.N.)	June 6	200	How to convert decimals to the nearest fraction. D.L. Russell (table)	Aug. 1	83
Submarine tankers for underwater oil-delivery from Arctic areas proposed (N)	May 23	99	Trans-Canada gas pipeline route wins approval from an FPC judge (C)	Feb. 14	28	How to design a metering system. G.R. Balasubramanian & K. Sivasankaran (flow-scheme)	Aug. 29	96
UC's "crude-oil cracking" to make ethylene will undergo prototype testing (C)	May 9	85	Plant Design			How to make a mounting for rotameter tubes. John J. Helstrom & Ramadas Venkatram (chart)	Dec. 19	104
UC's Ozaki quench cooler employed in crude-oil cracking process prevents coking on heat exchangers (C)	Sept. 26	41	Coal-gasification plants: Data deficiency hampers coal-gasification plant design. L.C. Yen & others (chart)	May 9	127	More on vaporization and condensation: Equilibrium-flash calculations with the SR-56. Edward Withee	Sept. 26	121
VFO protects against running out of gas	Aug. 15	*111	Dynamic challenges for tomorrow's CPI—report: Government			1976 Plant Notebook awards for best articles	Jan. 17	149
Venezuelan protein-from-oil venture is deferred indefinitely (C)	Aug. 15	88	OSHA, EPA and plant design. Frank W. Buehner (tables)	June 6	161	Quick calculations for piping insulation. V. Ganapathy (chart)	Nov. 21	219
West Germany: Shale-oil recovery tests (N)	Oct. 10	75	Instrumenting a plant to run smoothly. Norman Lieberman (flowschemes)	Sept. 12	*140	A quick way to figure slurry densities. V. Ganapathy	July 4	144
Phenol			Outdoor bulk storage for hydrophilic materials. Jesse C.Z. Ku & Denis Bevan (tables, diagrams, graphs)	Aug. 29	*69	Rapid sizing of vessel nozzles for safety-valve service. R.P. Willis	June 6	200
Environmental engineering DESKBOOK see DESKBOOKS			Plant layout—CE Refresher. Robert Kern (charts, tables, diagrams) (R)			Recovery calculation for a separation process. Mark C. Anderson	Dec. 19	106
Gulf goes into phenol production to upgrade cumene (N)	July 18	57	1. How to manage plant design to obtain minimum cost	May 23	*130	Relating heat emission to surface temperatures. V. Ganapathy (nomograph)	Dec. 19	106
Shell starts world's largest phenol plant at Deer Park, Tex. (N)	Oct. 24	77	2. Specifications are the key to successful plant design	July 4	*123	A rhyme for differentiating fractions. Dave Fujie	Apr. 11	160
Philippines			3. Layout arrangements for distillation columns	Aug. 15	*153	Savings with standardized thermowells. S. Raghavachari	Apr. 11	160
Ferrosilicon plant (N)	Jan. 17	75	4. How to find the optimum layout for heat exchangers	Sept. 12	*169	Scaling-corrosion test made easy. Arup K. Sen-gupta (nomograph)	Aug. 1	83
Gasoline substitute: alcohol from molasses (N)	Sept. 12	93	5. Arrangements of process and storage vessels	Nov. 7	93	Solar water-heater. Daljit Singh & R.S. Chauhan (chart, diagram)	Feb. 14	106
Texas A&M Univ. technique for recovering oil from coconuts without preliminary drying (C)	Aug. 29	17	6. How to get the best process-plant layouts for pumps and compressors	Dec. 5	131	Space requirements for stairs. F. Caplan (nomograph)	Aug. 1	84
Phosphate—Fertilizer supply and demand: outlook. John R. Douglas & Charles H. Davis (tables, graphs)	July 15	*89	Platform-mounted pulp plant gets set to sail. Richard Greene (diagram) (N)	Aug. 29	30	Steam from flashing condensate. Bill Sisson (nomograph)	Feb. 14	105
Phosphoric Acid			Space requirements for stairs. F. Caplan (nomograph) (P.N.)	Aug. 1	84	Trigonometry's chief ratios. Robert Lemlich. (P.N.)	Oct. 24	156
Freeport's plant to win uranium from phosphoric acid using DEPA-TOPO process (C)	Jan. 17	67	Techniques for saving energy in processes and equipment—report (flowsheets, graphs, table) (R)			A viewing port for spattering processes. T. Hsieh	Apr. 11	160
Recovering uranium from wet-process phosphoric acid: two processes, DEPA-TOPO and OPAP. Fred J. Hurst & others (flow-sheet)	Jan. 3	56	Balancing energy costs against equipment costs. S.B. Zdonik	July 4	99	Tubed heat-transfer. P.D. Kulkarni & P.S. Phadke	Feb. 14	108
Phosphorus—Hoechst Fibers' flame resistant polyester fiber (Trevira 271) incorporates phosphorus (C)	Nov. 7	43	Plant Layout			Plant Operation		
Phosphorus Pentasulfide—Monsanto plans revamping of production facilities (C)	Sept. 26	44	Environmental engineering DESKBOOK see DESKBOOKS			Economic penalties of operating a process at reduced capacity. F.A. Holland & F.A. Watson (charts & tables)	Jan. 3	91
Photochemical Diodes—Allied announces development of photochemical diodes that operate in a manner analogous to photosynthesis (C)	Feb. 14	26	Plant layout—CE Refresher. Robert Kern (charts, tables, diagrams) (R)			Energy-saving schemes in distillation. William C. Peterson & Thomas A. Wells (tables, graphs, flowschemes)	Sept. 26	*78
Photography—GAF will close its consumer film business and sell its dye stuffs plant (C)	Aug. 15	88	1. How to manage plant design to obtain minimum cost	May 23	*130	Instrumenting a plant to run smoothly. Norman Lieberman (flowschemes)	Sept. 12	*140
Phthalic Anhydride—German reactor design slashes phthalic anhydride energy costs—uses von Heyden process (C)	Dec. 5	65	2. Specifications are the key to successful plant design	July 4	*123	Management by exception in operations and maintenance. W.H. Weiss	Dec. 5	151
Pigments			3. Layout arrangements for distillation columns	Aug. 15	*153	Microprocessors enhance computer control of plants. David L. Williams (flowcharts, graphs)	July 18	*95
Healthy growth ahead. Richard Greene (table) (N)	Sept. 26	58	4. How to find the optimum layout for heat exchangers	Sept. 12	*169	Operating and maintenance records for heating equipment. Edgar C. Sharp, Jr.	Pt. I Apr. 25-141	171
Plastics industry's use of colors in '76 (N)	Aug. 1	25	5. Arrangements of process and storage vessels	Nov. 7	93	Pt. II May 23		
Sun Chemical to build world's largest organic pigments-only plant in Muskegon, Mich. (C)	Oct. 10	70	6. How to get the best process-plant layouts for pumps and compressors	Dec. 5	131	Plastic centrifugal pumps for corrosive service. Ed Margus (table)	Feb. 28	213
Pipe & Pipelines			Plant Location					
Alaskan natural gas lines			Barriers grow for plant-siting. Guy E. Weismantel (N) (table)	June 20	69			
Alcan pipeline proposal gets tentative nod from Canada: route decision (C) July 18		53	Why Dow nixed California	July 4	70			
FPC splits in deciding the best arctic-gas pipeline route (C)	May 23	96	California: Dow drops plans for petrochemical plant (C)	Jan. 31	55			
Gas shortages may fuel fresh debate over an Alaskan pipeline route (C)	Jan. 31	53	California may soften its strict plant-siting requirements (C)	Mar. 14	74			
			Floating plants: Davy Powergas and Mitsubishi to cooperate in marketing methanol plants on sea-going barges (N)	Feb. 28	121			
			Japan to decentralize industrial capacity (N)	Aug. 1	25			
			Offshore: LOOP Inc. nears its construction					

NOTES—*Illustrated: (C) Cimentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Security for CPI. Sami Atallah (diagram)	139	Springborn Labs.' "Digest of Polymer Developments" predicts that HDPE and polypropylene rates will drop but LDPE will improve (C)	72	Raudsepp, 1. Apr. 11-135 2.	133
Plastics				Learn computer programming the convenient way. Loren F. Hazelwood	103
CE construction alert (R)	101	Polyparabanic Acid—Exxon's high-temperature film Tradlon (C)	87	Speechmaking: Better visuals make speeches better. Merritt G. Marback (diagrams)	141
Contracting for new construction. Eric M. Bergtraum (tables)	133	Polypropylene		Project Engineering	
Increased manufacturer's appropriations for new plants and equipment (C)	59	Amoco Chemicals Belgium SA starts PP plant at Geel (N)	99	How to achieve effective project control. Robert A. King (charts, graphs, tables)	117
ABS/SAN capacity boost by Monsanto (N) Dec. 5	71	Diamond Shamrock's La Porte, Tex. PP plant and related business sold to Arco Polymers (C)	86	Improve your efficiency in writing computer programs. Richard A. Russell	111
Auto makers opt for Varian's chrome-coating process for plastic parts (N)	47	Exxon Chemical Co. U.S.A.'s two-part debottlenecking project at Baytown, Tex. (N)	99	Profitability studies. F. A. Holland & F. A. Watson (charts, tables)	87
Automotive: Plastics move to make a bigger dent in cars. Rita McKay (table) (N)	78	ICI Australia Ltd. plans PP plant in Sydney Botany Bay (N)	99	I. Putting inflation into profitability studies	87
California issues new safety regulations for metallized plastics (N)	25	Japanese ash-less, solvent-less PP process (C)	86	II. Project risk, inflation, and profitability	133
CE construction alert (R)	106	Springborn Labs.' "Digest of Polymer Developments" predicts that HDPE and polypropylene rates will drop but LDPE will improve (C)	72	Propylene	
New processes and technology alert (R)		Polypropylene See also Propylene		Bayer AG Degussa: peracid route to propylene epoxidation (C)	59
42nd inventory	113	Polyurethane—Sweden's underground LNG storage system: rock caverns coated with polyurethane (N)	47	Capital spending: Report reveals CPI growth signals. Richard Greene (table) (N)	56
43rd inventory	107	Polyvinyl Chloride		Dimersol process provides option for non-leaded gas makers. Philip M. Kohn (flowsheet, tables)	114
Plastic centrifugal pumps for corrosive service. Ed Margus (table)	213	N.J. law may have significant CPI impact (C)	54	Dynamic challenges for tomorrow's CPI—report: Materials and energy. Future supply and demand for basic petrochemicals. Eugene J. Debrecezi (charts)	135
Plastics industry's use of colors in '76 (N) Aug. 1	25	Production growth (N)	93	Forecast from CMRA's "World Review & Forecast" meeting (N)	99
Prices: Rising prices will spur use of additives (N)	117	South Africa: AECL betting on PVC shortage (N)	81	Shell Chemical's Norco, La. installation (C)	41
Sales, use and production—SPI report (C)	59	Potash		Propylene See also Polypropylene	
Scrapless thermoplastics-forming technique (Jefroming) cuts resin waste by 15% using extrusion technique (C)	60	Fertilizer supply and demand: outlook. John R. Douglas & Charles H. Davis (tables, graphs)	*89	Propylene Oxide—Production: new processes. Mark D. Rosenzweig (flowscheme) (N) Oct. 24	84
Thermoplastic resins show healthy growth (N)	93	GSL's potash flotation process produces sulfate-of-potash fertilizer from brine. Bruce Tippin (flowcharts)	73	Protein	
Thermoplastics: U.S. markets. Edmund S. Childs (tables)	163	Letter	162	Italy: Liquichimica renews hopes for its single-cell protein investment (C)	114
U.S. plastics to show healthy growth—Arthur D. Little report (N)	82	Jacobs Engineering awarded contract for potash-recovery project in Jordan (N) Dec. 5	71	Italy's single-cell protein industry: findings on SCP safety good, government-imposed shutdown of one partially operating SCP plant, and the delay of startup of another (C) Apr. 25	58
Piping: Tips on FRP piping. L.S. Surtees & P. Rooney	215	Potassium—Fertilizer supply and demand: outlook. John R. Douglas & Charles H. Davis (tables, graphs)	*89	Venezuelan protein from oil-venture is deferred indefinitely (C)	88
Plastics See also specific plastic		Powders		Pulp & Paper	
Polyalphaolefins—Synthetic-lubricant growth may be hindered says ODC (N)	47	Cutting process. Powder Jet, slices through thick metal sheets	*93	Air-quality: Tougher rules for pulp-and-paper won't cause a capital shortage (C)	70
Polybenzimidazole (PBIL)—Reverse osmosis uses Teijin's new membrane—PBIL polymer (C)	72	Metal powders as hydrogen "sponges" may find use in gas-purification and energy systems (C)	61	CE construction alert (R)	122
Polybutylene—Witco PB business may be sold to Shell (C)	111	Pressure		New processes and technology alert, (R) 43rd inventory	109
Polycarbonate—Rohm and Haas Co. Tuffak CM abrasion resistant polycarbonate coated sheet (N)	57	Charts simplify spiral finned-tube calculations. V. Ganapathy (nomographs)	117	Platform-mounted pulp plant gets set to sail. Richard Greene (diagram) (N)	30
Polychlorinated Biphenyls		Rapid sizing of vessel nozzles for safety-valve service. R.P. Willis (P.N.)	200	Pulp-bleaching process cuts costs, time, effluent. Philip M. Kohn (tables, flowsheet)	126
Bulrushes show promise for paring PCBs (N)	79	Steam from flashing condensate. Bill Sisson (nomograph) (P.N.)	105	Pumps	
EPA issues its first toxic-effluent limitations—setting zero-discharge standards for some chemicals (C)	56	Prices		Diagnosing troubles of centrifugal pumps. S. Yedidia (tables, graph, diagrams)	141
Uniroyal's new lubricants: polymerization produces polyalphaolefin—can replace PCBs (N)	57	ERDA study (MOPPS) eyes energy technologies in terms of market, not supply (C)	64	Part I Oct. 24 *124, Part II Nov. 21-193	141
Polyester		Higher outputs predicted for industrialized nations (N)	57	Part III	141
Bottle production steps up, while acrylonitrile output shuts down (C)	73	Toxicological controls will up chemicals prices (N)	23	Dimensional variations on centrifugal pumps: effects. Fred Buse (diagrams)	93
Celanese employee found guilty of selling polyester-film trade secrets (C)	94	Printing—Controls tighten on TDI in British printing industry (N)	25	Finding and fixing hot pump bearings. Robert Shields	103
Hoechst Fibers' flame-resistant polyester fiber (Trevira 271) incorporates phosphorus (C)	43	Process Equipment		In-plant slurry handling—report (charts, tables, diagrams) (R)	*94
Rohm & Haas wants to liquidate its interest in Carodol (N)	61	Cost estimating for major process equipment—report. Arkadie Pikulik & Hector E. Diaz (tables, graphs) (R)	*106	1. Pipeline design for industrial slurries. A. J. Carleton & D. C. H. Cheng	96
Polyethylene		Estimating the costs and weights of process vessels. P.S. Phadke & P.D. Kulkarni (nomograph) (P.N.)	157	2. Slurry pump selection and application. J. Ingemar Dalstad	*101
HDPE: Production growth (N)	93	How to make the correct economic decision on spare equipment. Gerald O. Davis (diagrams, tables)	*187	3. Instrumentation for slurry systems. Nicholas J. Poulis & David Silvermetz	107
LDPE: UC's gas-phase LDPE process at Seadrift, Tex. uses lower pressure (C)	111	Pressure-relief valves for process plants. Robert Kern (charts, tables, diagrams)	*187	Plant layout series see under CE Refresher	
Outdoor bulk storage for hydrophilic materials. Jesse C.Z. Ku & Denis Bevan (tables, diagrams, graphs)	*69	Response of temperature-measuring elements. Paul W. Kardos (diagrams, tables, graphs)	79	Plastic centrifugal pumps for corrosive service. Ed Margus (table)	213
Springborn Labs.' "Digest of Polymer Developments" predicts that HDPE and polypropylene rates will drop but LDPE will improve (C)	72	Selecting sight flow indicators. Roger McDonough	*113	Select pumps to cut energy cost. John H. Doolin (charts, diagram)	*137
Polyethylene Terephthalate—Polyester bottle production steps up, while acrylonitrile output shuts down (C)	73	Systematized failure analysis. R.P. Lee (charts, tables, diagrams)	*107	Purchasing—Techniques for saving energy in processes and equipment—report (flowsheets, graphs, table) (R)	110
Polymerization		Some unusual failure modes	*129	Equipment-purchasing policies that save energy. Enrique J. Armstrong	110
Dry-cleanable leather: new treatment called PolyRetanning. Vincent Cavaseno (N)	104	How poor design causes equipment failures	123	Pyrolysis	
Motionless mixers move into new processing roles. Mark D. Rosenzweig (N)	*95	Vessels, process and project data for vessel design. Richard E. Markovitz (tables, diagrams)	69	Germany: Waste pyrolysis yields chemical feedstocks (C)	19
Pennwalt's plant at Crosby, Tex. will make peroxyester polymerization-initiators (C)	89	Processes—Computerized system for evaluating and comparing chemical processes under development (C)	59	Municipal-solid-waste pyrolysis in California (N)	75
Testing olefin-polymerization catalysts. R.F. Gold & others (tables, diagrams)	*119	Product Development—Pitfalls in evaluating R&D. Anthony V. Perrella	112	Scrap-tire pyrolysis nears commercialization (C)	111
Uniroyal's new lubricants: polymerization produces polyalphaolefin—can replace PCBs (N)	57	Production		R	
Polymers		Higher outputs predicted for industrialized nations (N)	57	Radiation	
Gulf will market new high-temperature polymers: Thermid 600 series (N)	23	Operating rates for next year—reports from McGraw-Hill and First Boston Corp. (C)	112	Electron radiation to destroy toxic water-pollutants discussed at AIChE meeting (C)	66
Polymeric food-colorant gains commercial palatability (C)	26	Professional Development			
Reverse osmosis uses Teijin's new membrane—PBIL polymer (C)	72	Do a better job of selling your ideas. Eugene			

NOTES—*Illustrated: (C) Cumentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Ground level detector tames flare-stack flames. Thomas R. Schmidt (charts & diagrams) ... Apr. 11		Recycling: Gould's scrap rubber tire reclama- tion process (C) July 4	61	Benzene standards see Benzene	
Microwave technology: penetrating CPI mar- kets. Philip M. Kohn (N) Jan. 3	*50	Russia		Bingham, Eula proposed as administrator of OSHA (C) Feb. 28	116
—Correction Mar. 14-5 Mar. 28	5	Anglo-Russian methanol deal (C) June 6	67	Cadmium-exposure standards: OSHA changes its standards-setting procedure (C) Feb. 14	28
Radioactivity		Italy to build a surfactant plant in Siberia (N) Nov. 7	47	Dawes Labs., maker of DES, fined \$34,100 (C) July 4	64
ASEA tests isostatic pressing technique for taming "hot" radwastes (N) Mar. 14	81	Joint U.S.-U.S.S.R. project for better process control (C) Oct. 24	72	Idaho Court ruling casts doubt on OSHA job-site inspection authority (C) Jan. 17	69
Nuclear waste disposal: efforts of worldwide groups. Peter R. Savage (N) June 20	*72	Petrochemical contracts with Technip and Eurotecnica (C) Jan. 17	68	Identifying and regulating carcinogens in the workplace: comprehensive policy pro- posed (C) Feb. 14	28
Radioactive wastes: Acid digestion for low-level radwaste set for trying (N) May 23	99			CPI asks for slow look at new policy (N) Mar. 14	28
Swedish test of granite caverns as radioactive- waste repositories gains ERDA financial support (C) June 20	61			Categories for suspected materials (C) ... Oct. 24	74
Reactors				Lead in the workplace: revised limit hearing (C) Jan. 17	70
German reactor design slashes phthalic an- hydride energy costs—uses von Heyden process (C) Dec. 5	65	Safety		Nickel: OSHA considers reducing workday exposure following NIOSH report (C) ... Oct. 10	72
HTGR: World's first commercial-size plant using high temperature gas-cooled reactor for its steam supply online (N) Jan. 17	75	Asthma attacks related to particulate and sul- fate levels in air? EPRI says not necessarily (C) May 23	95	OSHA moving to balance health and safety- report Apr. 11	*108
Recorders—Three bench-top recorders make-but (table) Sept. 26	*63	Atlantic Richfield's Philadelphia refinery distillate-oil tanks fire (C) Feb. 14	25	Pt. I OSHA—Where it stands, where it's going. William P. Demery Apr. 11	*108
Refineries and refining see Petroleum		California issues new safety regulations for metallized plastics (N) Aug. 1	25	Pt. II A comprehensive approach to occu- pational safety and health. Ralph M. Gelburd Apr. 11	*114
Research		Canada: P.V. Containers' process eliminates dusts in handling solid sulfur (N) Oct. 10	75	Pt. III Industrial hygiene control methods. Richard F. Scherberger Apr. 11	*118
Brazil: Petrobras and Pullman Kellogg agree on joint R & D (C) Aug. 1	19	Cancer		Redirection to focus on more-serious prob- lems (N) June 20	67
Bulrushes show promise for paring PCBs (N) Apr. 11	79	Acrylonitrile: Du Pont textiles plant in Cam- den, S.C. carcinogenicity study (C) June 6	67	Ruptured vessel pours scalding water over workmen at Monsanto's styrene facility (C) Dec. 15	67
Clathrates, new materials freeze and thaw at room temperature (C) Apr. 11	72	Acrylonitrile bottles see Acrylonitrile		Safeguarding against shoe hazards. Russell C.W. Crom (diagrams) Mar. 28	*90
Coal conversion projects see Coal		California requires registration of cancer causing materials by July 1 (C) June 20	60	Scotland: Stiffer design-specifications for LPG tanks improve safety (C) July 18	52
Design and analysis of industrial experiments. Thomas D. Murphy, Jr. (charts, tables) ... June 6	168	EPA determines several classes of chemicals with high risk of carcinogenicity or mutagenicity (C) June 20	62	Security for CPI. Sami Atallah (diagram) Oct. 10	139
Du Pont bolsters feedstock R&D, emphasizing coal (C) Mar. 14	75	Ethylene oxide comes under suspicion (C) July 4	64	Shell Chemical's ex-employee files health- damage suit (N) Feb. 14	31
Dynamic challenges for tomorrow's CPI— report: Pinpointing the needs in research and development. Donald E. Garrett (chart) ... June 6	146	Great Britain: Rubber and cablemaking workers' cancer risk survey (C) Jan. 3	36	Shell Oil testing tube dewaxing for possible cause of nerve disease (N) Jan. 17	75
Energy R&D programs presented to Pres. Car- ter by the TVA (C) Sept. 12	89	Italy: cancer deaths result in jail sentences for IPCA officials (C) July 4	62	Spending for employee safety and health McGraw-Hill survey (C) June 6	68
ERDA funds osmosis and electrolysis studies aimed at wringing energy from salt water (C) Aug. 1	20	Methylene chloride study indicates no evi- dence of cancer in test animals (N) June 6	75	Standard Oil's computer-based health and en- vironmental management system (C) Sept. 26	43
ERDA upgrades its research effort on silicon solar cells (C) Sept. 26	44	N.J. plans major study on cancer deaths (C) Jan. 3	36	Sweden: campaign to assemble information on chemicals into a central data bank—the Chemical Product Registry (C) Dec. 5	66
ERDA wants new research ideas, reward: \$20,000 (N) Jan. 3	43	New York: carcinogens in drinking water (N) Oct. 24	77	Swedish study of dynamite workers: New data on heart attacks (N) Mar. 28	61
Excessive CO ₂ in air could cause "greenhouse effect": force limits on fossil-fuel in 50 yrs— NRC study (C) Aug. 1	20	Nitrites and nitrosamines: Multiagency ac- tion could begin soon (C) Aug. 29	20	Toxic Substances Control Act see Toxics	
Exxon reorganizes coal related research (C) ... Sept. 26	43	Shell Oil's isopropanol facility passes medi- cal checkup (C) Oct. 10	71	VCM: unloading and storage technique for VCM—vapor-liquid-exchange process. Asu Mukerji (flowschemes, chart) Sept. 12	155
Ford Administration's last budget request ear- marks \$28 billion for R&D (C) Jan. 31	56	UC's South Charleston, W.Va. VCM plant: former employee fifth victim of liver cancer (C) July 18	52	What to do when disaster strikes—Stardust plant fire-report. Henry E. Webb, Jr. (checklist, map) Aug. 1	*47
Guayule desert bush pushed as a natural- rubber alternative (C) Apr. 11	72	Carbonated-drink packs: FDA tests and rulings. Richard Greene (N) July 18	59	Safety see also Health	
Hydrogen: Hopes fly high for new hydrogen pro- cesses. Philip M. Kohn (N) Mar. 14	86	Chemicals giving birth to human reproductive worry. Luigi Ricci (table) (N) Aug. 1	30	Salaries	
Japanese research program to recover uranium from the sea (C) Apr. 11	72	Qu. chemical factory may be causing cancer-risks too Aug. 1	34	Salary offers for new graduates are up, accord- ing to College Placement Council (C) Mar. 28	53
N.J. Energy Research Institute sets out to solve energy problems of the Northeast (C) Feb. 14	27	Congress moves to legislate freer access to pesticides safety data (C) Aug. 29	72	See how your salary looks now. Jay Matley (charts) Jan. 17	141
Pitfalls in evaluating R&D. Anthony V. Per- rella Aug. 1	59	Pesticide makers and House agree to a for- mula for access to date (C) Oct. 10	54	U.S. engineers no longer rank first in salary worldwide (C) Nov. 21	111
Pres. Frank, nominated as President Carter's science adviser (C) Apr. 11	74	Coordinated carcinogen policy: interagency committee (C) July 18	114	Saudi Arabia	
R&D at work (Ed) June 20	5	DBCP (Fumazone & Nemagon) may be respon- sible for male sterility at Occidental (C) ... Aug. 15	88	Exxon: Saudi firm move closer to joint pet- rochemical venture (N) Apr. 25	65
R&D spending: Bigger chunk of industrial R&D funds is going to energy production and conversion investigations (C) Jan. 31	54	OSHA prepares emergency temporary stan- dard: Dow and Shell test employees (C) Sept. 12	90	LPG exports to skyrocket (N) June 6	75
R&D spending: Energy crisis making a big impact—McGraw-Hill survey (C) June 6	68	OSHA's proposed permanent standard (C) Nov. 21	114	Reverse-osmosis unit from UOP (N) Sept. 26	47
Spanish moss: Air pollution indicator may be new application (N) Apr. 11	79	Dynamic challenges for tomorrow's CPI-report (charts & tables) (R) June 6	*103	Scheduling—How to achieve effective project control. Robert A. King (charts, graphs, tables) ... July 4	117
"Super slurpers": USDA researchers report a boost in distilled water absorber (C) Mar. 14	74	Consequences of regulation: short range... long range...Borden R. Putnam June 6	158	Scrubbers	
Resins		OSHA, EPA and plant design. Frank W. Buehner June 6	161	Charged scrubber snags submicron particles (diagram) May 9	107
Asahi-Dow's route to ionomer resin (C) Oct. 24	73	EDF wants EPA to declare a material car- cinogenic on the basis of only one test (C) ... Nov. 21	114	Diffusivities streamline wet scrubber design. Alex C. Mottola (diagrams) Dec. 19	77
Exxon high-temperature film Tradlon (C) ... Sept. 12	87	Environmental Inhalation Toxicology Facility will examine effects of combinations of air- borne contaminants (C) June 20	61	Electric spark of ionizers hikes scrubber effi- ciency. Larry J. Ricci (diagrams) (N) Sept. 26	52
Scrapless thermoplastics-forming technique (Jetforming) cuts resin waste by 15% using extrusion technique (C) June 20	60	Fire: Valve meets fire-safe tests (diagrams) ... Oct. 10	*95	Enviroengineering, Inc. testing service helps de- termine wet-scrubber design parameters (C) Jan. 17	68
Reverse osmosis see Water Treatment—Desalting: Water Treatment—Reverse Osmosis		Fire resistance—how to test for it. William A. Rains (charts & table) Dec. 19	97	Flue-gas desulfurization processes: Utilities scrub out SO _x . Richard Greene (tables) (N) May 23	101
Rhodium		Great Britain: Controls tighten on TDI in print- ing industry (N) Aug. 1	25	Letters Sept. 12	5
Mitsubishi's expansion of 2-ethylhexanol cap- acity using rhodium catalyst (C) Feb. 14	25	H&P Equipment's stainless-steel vat purchased by Fabricolor explodes on loading dock (C) Aug. 15	89	Correction (letter) Oct. 10	5
Rhodium-containing chemical converts sun- light to fuel (N) Sept. 26	47	Inspect tank cars before shipping in them. How- ard Morris, Jr. (diagrams) Nov. 7	*109	Getty's sulfite scrubbing process will handle stackgas emissions from burning coke (C) Aug. 29	17
Rubber		OSHA		Particulate scrubbers (diagrams, flowschemes, graphs, tables) (R) Nov. 21	107
CE construction alert (R) Mar. 28	120	Actions spawn a new trade group—the American Industrial Health Coun- cil (C) Dec. 5	67	How to choose a particulate scrubber-report Seymour Calvert Aug. 29	*54
Cryogenic grinding: recycling of scrap rubber. Larry J. Ricci (N) July 4	*71			Practical process design of particulate scrub- bers. Konrad T. Semrau Sept. 26	87
A primer on cryogenic size-reduction July 4	*72			Get better performance from particulate scrubbers Upgrading existing particulate scrubbers. Seymour Calvert Oct. 24	133
Guayule desert bush pushed as a natural- rubber alternative (C) Apr. 11	72			Troubleshooting wet scrubbers. William	
Hycar specialty rubbers buildup looms (N) ... May 9	104				

NOTES—*Illustrated: (C) Cimentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Gilbert Oct. 24	140	Powder testing techniques for solving industrial problems. Eisenhart-Rothke & Peschl Mar. 28	97	(C) Mar. 28	55
Halt corrosion in particulate scrubbers. Thomas G. Gleason Oct. 24	145	Systems approach for in-plant bulk materials handling. Schofield & Sutton Mar. 28	103	Canada: P. V. Containers' process eliminates dusts in handling solid sulfur (N) Oct. 10	75
Tray scrubber has high turndown ratio (flowscheme) Nov. 7	*65	Methods for conveying and weighing solids (charts, tables, diagrams) Feb. 28	176	Desulfurization see Desulfurization	
Wet-scrubber design from Hammermill Paper promises higher energy efficiency (C) Mar. 28	54	Designing for batch and continuous weighers. J. R. Mitchell Feb. 28	177	Fertilizer supply and demand: outlook. John R. Douglas & Charles H. Davis (tables, graphs) July 18	*89
Seaweed		Using helical screws for solids handling. L. Bates Feb. 28	183	Gulf Oil Canada to test its sulfur-asphalt binder on Michigan state highway (C) July 18	52
FMC Corp. bids for seaweed processor Marine Colloids Inc. (C) Aug. 1	18	Solvents		Environments engineering DESKBOOK see DESKBOOKS	
Seaweed-based fertilizer dubbed Kelpus (N) Apr. 11	79	Fast payout for in-plant recovery of spent solvents. James M. Teale (diagram) Jan. 31	98	Japan's petroleum refiners have oversupply of sulfur (N) Aug. 15	93
Separation		Schuch Engineering's recovery process recycles mixed solvents from antibiotics production (C) Sept. 12	88	Sulfur Dioxide	
Designing parallel-plates separators. Julio G. Miranda (charts, diagrams) Jan. 31	105	Southern Co. test burns solvent-refined coal (SRC); Wheelabrator-Frye and Gulf Mineral Resources interested in SRC (C) Aug. 1	19	Allied Chemical's fluegas desulfurization based on low-energy membrane electrodialysis (C) Sept. 12	89
Hydrocyclones: dimensions and performance. Adam Zanker (charts, diagram) May 9	122	South Africa		Environmental engineering DESKBOOK see DESKBOOKS	
Mineral processing methods: review and forecast. Lawrence A. Roe (flowchart, diagram, table) June 20	*102	AECL betting on PVC shortage (N) Mar. 14	81	Flue gas desulfurization to cost U.S. billions—Frost & Sullivan study (N) Sept. 12	93
New plot enhances value of batch-thickening tests. Eli Barnea (tables, graphs) Aug. 29	75	Discrimination: Common Market adopts non-discriminatory code (N) Oct. 10	75	SO ₂ control system undergoes evaluation (N) Nov. 21	117
Oil/water splitter snags emulsified oil (flow diagram) July 18	77	Standards		Sulfuric Acid	
Pressure filtration: Getting the most out of diatomite filteraids. Arthur J. Basso (flow-sheet, table) Sept. 12	*185	Metric system		Air dilution for sulfuric acid plants. M. A. Beer & J. A. Andrade Leite (chart) (P.N.) Nov. 21	220
Recovery calculation for a separation process. Mark C. Anderson Dec. 19	106	Metrication scorecard. John C. Davis (N) (table) Nov. 21	122	Choosing materials for sulfuric-acid services. David W. McDowell July 4	*137
Right absorber oil cuts operating costs. Paul Adler Dec. 5	125	... the U.K. tries for all metric. Tyler Marshall (N) Nov. 21	124	Estimating acid dewpoints in stack gases. Robert R. Pierce (charts, tables) Apr. 11	125
Shale Oil		Pollution standards see Air Pollution; Environment; Water Pollution		Monsanto Enviro-Chem Systems introduces sulfuric acid plants designed specifically to use H ₂ S from coke-oven gas (C) Mar. 14	73
Australia studies shale oil feasibility (N) Apr. 11	79	Tips on FRP piping. L. S. Surtees & P. Rooney Nov. 21	215	Selective oxidation in sulfuric and nitric acid plants: current practices. B. G. Mandelk & W. Turner (chart, table, flowsheets) Apr. 25	123
Canada: Amoco will resume pilot-plant studies of in situ recovery of bitumen from the Athabasca oil sands (C) Jan. 17	68	Workplace exposure standards see Safety—OSHA		Supervision	
Chemical feedstock alternatives: reducing dependence on petroleum (C) Oct. 24	72	Starch		Alcoholism: How you can help the alcoholic. Allan Lucks May 9	149
Occidental's in situ oil-shale retorting at Logan Wash gets a big boost from DOE (C) Oct. 24	74	Starch gains new status as filler, raw material (N) Dec. 19	*36	It takes more than engineering talent. Jack M. Vogel Aug. 29	85
Superior Oil's process wins oil, minerals from shale (N) Apr. 25	65	"Super slurpers": USDA researchers report a boost in distilled-water absorbency (C) Mar. 14	74	Shortsighted supervisors: victims of the chocolate ice cream syndrome. David Francis Curran Aug. 1	73
West Germany: Shale-oil recovery tests (N) Oct. 10	75	Steam		Surfactants—Italy to build a surfactant plant in Siberia (N) Nov. 7	47
Shipping		Basic data for steam generators—at a glance. V. Ganapathy (P.N.) (charts) June 6	87	Sweden	
Gulf Coast supertanker ports get a green light; Loop Inc. and Seadock Inc. plans uncertain (C) Jan. 3	38	Cogeneration plant serving Gulf Coast manufacturers: designs and cost estimates being studied by Stone & Webster (C) Sept. 12	137	ASEA test isostatic pressing technique for taming "hot" radwastes (N) Mar. 14	81
Loop learns construction, Seadock delayed; stiff license terms (C) Aug. 15	88	Designing steam transmission lines without steam traps. Mileta Mikasinovic & David R. Dautovich (diagrams) Mar. 14	*95	Campaign to assemble information on chemicals into a central data bank—the Chemical Product Registry (C) Dec. 5	66
Hazardous materials: Efforts to strengthen regulations (C) Jan. 3	38	Estimating the costs of steam leaks using a "steam piccolo." Jack Goyette (P.N.) Aug. 29	73	Firm may merge: KemaNord and Nitro Nobel AB (N) June 20	67
Inspect tank cars before shipping in them. Howard Morris, Jr. (diagrams) Nov. 7	*109	Operating performance of steam-heated reboilers. Albert E. Helzner (diagram, tables) Feb. 14	5	Fluorocarbon propellant ban likely (C) Jan. 3	36
Submarine tankers for underwater oil delivery from Arctic areas proposed (N) May 23	99	—Letters Oct. 24	105	MX-Processor: Soot from oil- or coal-fired plants may make a good vanadium source (C) Mar. 28	54
Silicon		Steam from flashing condensate. Bill Sisson (nomograph) (P.N.) Feb. 14		Study of dynamite workers: New data on heart attacks (N) Mar. 28	61
Alcoa and ERDA's direct-reduction method for making aluminum-silicon alloy (C) Sept. 26	42	Steel		Study warns if coal- or oil-burning power plants were to replace nuclear facilities, there would be serious health and environmental effects (N) May 9	93
ERDA upgrades its research effort on silicon solar cells (C) Sept. 26	44	Hazen's new iron carbide process gives steel makers wider feedstock options (C) Aug. 15	87	Test of granite caverns as radioactive waste repositories gains ERDA financial support (C) June 20	61
Silicon Carbide—Carborundum's more-chemical-resistant SiC heating-bar elements for electric heating in chemical processing (C) Nov. 7	41	Magnetized steel wool for cleaning solvent refined coal tested by MIT (C) May 23	95	Underground LNG storage systems: rock caverns coated with polyurethane (N) Sept. 26	47
Sizing		Wear and galling can knock out equipment. W. J. Schumacher (tables) May 9	155	VCM: KemaNord's average VCM in-plant concentrations are below levels achieved elsewhere (C) Jan. 3	37
Distillation: Shortcuts for distillation design—report. Otto Frank (tables, graphs, charts, diagrams) (N) Mar. 14	*110	Welding practices that minimize corrosion. Frank C. Brautigam Jan. 17-145 Feb. 14	*97	Wind-energy conversion systems from Hamilton Standard and Statsforetag AB (C) Oct. 10	70
Electrostatic precipitators in industry. Robert L. Bump (charts, tables, diagrams) Jan. 17	*129	Zinc-rich primers: Applicator's guide. Dean M. Berger (charts) Mar. 14	*147	Sweeteners	
Soap—Fluoroborate wastes clean effort uses inexpensive commercial soap (N) Apr. 25	65	Storage		Saccharin: Proposed ban by FDA spurs action (C) Mar. 28	56
Soda Ash		Battelle Columbus Laboratories: energy-storage water batteries may supplement peak-load electrical demands (C) June 20	59	Saccharin substitutes find no sugar coating in ban. Philip M. Kohn (N) June 6	80
Kerr-McGee's soda ash plant exploits mineral-laden brine by carbonation. Gerald Parkinson (flowscheme) Nov. 7	62	Metals find new role as hydrogen reservoirs. John C. Davis (flowscheme) (N) Sept. 12	*98	U.S. ban will hurt Japan; Europe goes its own way June 6	82
Superior Oil's process wins oil, minerals from shale (N) Apr. 25	65	Hydrogen sponges: what they are, how they work Sept. 12	98	Synthesis	
Solar Power		A method for designing rectangular storage tanks. Kanti K. Mahajan (tables, diagrams) Mar. 28	107	Air Products and Chemicals: Nitrogen trifluoride by direct syntheses—Kirkpatrick Award Honorable Mention Dec. 5	*116
Economics of process heat from solar energy. W. C. Dickinson (chart, diagram) Jan. 31	*101	Outdoor bulk storage for hydrophilic materials. Jesse C. Z. Ku & Denis Bevan (tables, diagrams, graphs) Aug. 29	*69	Motionless mixers move into new processing roles. Mark D. Rosenzweig (N) May 9	*95
Energy options to the year 2000—report. Richard E. Balzhiser (charts & tables) (R) Jan. 3	*72	Petroleum reserve program proceeds on schedule (C) Aug. 29	19	Tanks	
ERDA upgrades its research effort on silicon solar cells (C) Sept. 26	44	Plant layout series see under CE Refresher		H&P Equipment's stainless-steel vat purchased by Fabricator explodes on loading dock (C) Aug. 15	89
ERDA's solar heating and cooling demonstration program: cooling units get assist from the sun (N) Oct. 24	86	Sweden's underground LNG storage system: rock caverns coated with polyurethane (N) Sept. 26	47	A method for designing rectangular storage tanks. Kanti K. Mahajan (tables, diagrams) Mar. 28	107
Rhodium-containing chemical converts sunlight to fuel (N) Sept. 26	47	Swedish test of granite caverns as radioactive waste repositories gains ERDA financial support (C) June 20	61		
Solar concentrator (multiple-dye plan collector) may cut costs of installations (N) Dec. 5	71	VCM: unloading and storage technique for VCM-vapor-liquid-exchange process. Asu Mukerji (flowschemes, chart) Sept. 12	155		
Solar energy for process heat: cost must drop (N) Nov. 21	126	Styrene—Ruptured vessel pours scalding water over workmen at Monsanto's styrene facility (C) Dec. 5	67		
Solar water-heater. Daljit Singh & R. S. Chauhan (chart, diagram) (P.N.) Feb. 14	106	Sugar—A sweet future for sugar products: promising prospects as potential building blocks of many of today's petrochemical products. Philip M. Kohn (N) Jan. 31	63		
Solids		Sulfur			
Designing spouted beds. Adam Zanker (nomograph, diagrams) Nov. 21	207	Amoco's cold-bed adsorption technique ups efficiency of sulfur recovery from sour gas			

NOTES—* Illustrated; (C) Chemtator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Taxes	Can U.S. firms still compete abroad: tax changes and anti-boycott legislation. Guy E. Weismantel (table) (N) . . . Aug. 29	25	Japanese process yields aldehydes and alcohols via oxidation of toluene derivatives (C) July 4	63	Manganese-nodule exploitation: Lockheed-managed effort is new entry (C) . . Jan. 17	67
	U.S. citizens working abroad get a reprieve on taxes (C) . . . Oct. 10	72	Toluene Dilsocyanate		Unit Operations—Methods for analyzing drying equipment report see Dryers & Drying	
	Will new tax laws save or cost you money? Jay Matley . . . Mar. 28	125	Controls tighten on TDI in British printing industry (N) . . . Aug. 1	25	Uranium	
Technology			Mitsui Toatsu's process avoids phosgene (C) . . . Mar. 24	73	Enrichment: AIChE Annual Meeting details up-and-coming methods. Philip M. Kohn (diagrams) . . . Jan. 31	74
New processes and technology alert (R)			m-Toluidine—Mitsui Petrochemicals plant will make m-t and m-cresol by aminomethylation monomers (C) . . . Dec. 17	67	Enrichment: Carter's energy proposals (C) . . May 9	88
42nd inventory Jan. 31	109	Toxics			Enrichment: Facility approved by Carter at Portsmouth, O. (N) . . . Aug. 15	93
43rd inventory July 15	101	Benzene standards see Benzene			Enrichment: Gas centrifuges gain in Japanese U-enrichment (N) . . . Jan. 3	43
White House reorganization leaves technology advisor's office virtually intact, but nearly scuttles Council on Environmental Quality (CEQ) (C) . . . Aug. 1	20	Chemicals giving birth to human reproductive work. Larry J. Ricci (table) (N) . . . Aug. 1	30		Enrichment: Liquid-phase enrichment of uranium—French scientists report (C) . . May 23	94
Temperature		Our in-the-body chemical factory may be causing worker-ills too . . . Aug. 1	34		Enrichment: Uranium-enrichment update. Guy E. Weismantel (table) (N) . . . Jan. 17	77
Calculate enthalpy with a pocket calculator. Raymond T. Schneider (tables) . . . May 23	145	CIT lists sixteen more chemical compounds for toxicological testing (C) . . . May 9	87		Freesport's plant to win uranium from phosphoric acid will use DEPA-TOPO process (C) . . . Jan. 17	67
Cutting costs with more expensive temperature indicators. S. Raghavachari . . . Dec. 19	103	Coordinated carcinogen policy: task force committee (C) . . . July 18	50		Japanese adsorbent to obtain the atomic fuel from low-grade ores (N) . . . June 20	67
Relating heat emission to surface temperature. V. Ganapathy (nomograph) . . . Dec. 19	106	(C) . . . Aug. 15	94		Japanese research program to recover uranium from the sea (C) . . . Apr. 11	72
Response of temperature-measuring elements. Paul W. Kardos (diagrams, tables, graphs) . . Aug. 29	79	Interagency Regulatory Liaison Group . . Nov. 21	114		Recovering uranium from wet-process-phosphoric acid: two processes, DEPA-TOPO and OPAP. Fred J. Hurst & others (flow-sheet) . . . Jan. 3	56
Water-gas shift reaction takes place at 95°C using a new catalyst: hydrogen producing reaction (C) . . . July 18	52	Environmental engineering DESKBOOK see DESKBOOKS			DEPA-TOPO process (C) . . . Aug. 29	19
Tennessee Valley Authority		Environmental Inhalation Toxicology Facility will examine effects of combinations of airborne contaminants (C) . . . June 20	61		Reprocessing: Nuclear-power prospects soured by oxide-fuel-reproducing stall. Peter R. Savage (table) (N) . . . Feb. 28	*123
Air pollution: TVA capitulates to EPA; to install pollution control equipment (C) . . . Apr. 11	74	Ethylene oxide comes under increasing suspicion of harmful health effects—EPA and OSHA studies (C) . . . July 4	64			
Ammonia from cost unit employs Texaco gasification process (C) . . . June 6	69	Government interagency committee on toxic substances releases list of toxic chemicals: EPA to test 50 (C) . . . July 18	54			
Coal purchases (N) . . . Nov. 7	47	Great Britain: New-toxic-substances control (C) . . . Jan. 31	54			
World's largest coal-washing plant to be built (N) . . . Nov. 21	117	The next stage of regulation: specific pollutants—interview with Thomas C. Jorling . . . Aug. 15	*125			
Terephthalic Acid		OSHA standards see Safety—OSHA				
Hercules Inc.'s new process for making purified terephthalic acid (C) . . . July 18	51	Toxic Substances Act				
ICI favors terephthalic acid as preferred precursor to polyester fiber (C) . . . Mar. 28	55	"Legionnaire's disease" leads to the first use of the Act's provision for a "citizen's petition" (C) . . . Jan. 3	38	V		
Testing		EPA's priority schedule for rulemaking comes up for debate (C) . . . Feb. 28	116	Valves		
Environmenting. Inc. testing service helps determine wet-scrubber parameters (C) . . . Jan. 17	68	EPA to assemble inventory and choose 15 materials for study (C) . . . Apr. 11	74	Control valve resists cavitation (diagram) . . . July 4	78	
New plot enhances value of batch thickening tests. Eli Barnea (tables, graphs) . . . Aug. 29	75	EPA changes course in its administration (C) . . . June 20	62	Plant layout series see under CE Refresher		
Olefins: Testing olefin-polymerization catalysts. R. F. Gold & others (tables, diagrams) . . . Jan. 31	*119	Industry asks for wider exemptions from reporting data (C) . . . Sept. 12	90	Pressure-relief valves for process plants. Robert Kern (charts, diagrams) . . . Feb. 28	*187	
Powder testing techniques for solving industrial problems. Eisenhart-Rothe & Peschl . . . Mar. 28	97	EPA says employees are responsible for reporting any health or environmental hazard (C) . . . Sept. 26	44	Rapid sizing of vessel nozzles for safety-valve services. R. P. Willis (P.N.) . . . June 6	200	
Toxicological testing see Toxics		First 10 of 50 chemicals or groups of chemicals due for testing (C) . . . Oct. 24	74	Valve meets fire-seal tests (diagram) . . . Oct. 10	295	
2,3,7,8-Tetrachlorodibenzo-p-dioxane (TCDD)—Italy. Icmesa's toxic dioxin contamination caused by explosion last July, spreads (C) May 9	87	Employees won't have to engage in "whistle blowing" (C) . . . Dec. 5	67	Vanadium—Scot from oil or coal-fired power plants may make a good vanadium source (C) . . . Mar. 28	54	
Thermodynamics		EPA relaxes rules on chemical reporting (C) . . . Dec. 5	68	Vapor Pressure—An approach to multiphase vapor-liquid equilibria. M. J. Leach (charts, diagrams) . . . May 23	137	
An approach to multiphase vapor-liquid equilibria. M. J. Leach (charts, diagrams) . . . May 23	137	Toxics-control-act implementation gets delayed (N) . . . Dec. 5	71	Vaporization—More on vaporization and condensation: Equilibrium flash calculation with the SR-56. Edward Witke (P.N.) . . . Sept. 26	121	
Calculate enthalpy with a pocket calculator. Raymond T. Schneider (tables) . . . May 23	145	Toxic Substances Strategy Committee headed by Council on Environmental Quality (C) . . . Nov. 21	114	Vibration		
Heat-capacity ratios for real gases. Claudio Purarelli (nomograph) (F.N.) . . . Mar. 14	153	Toxicological controls will up chemicals prices (N) . . . Aug. 29	23	Computerized onsite vibration analysis, offered by Exxon (C) . . . May 23	95	
Physical properties of selected gas streams. V. Ganapathy & others (graphs) . . . Feb. 28	195	U.S. CPI to face new demands in chemicals output reporting. Larry Marion (N) . . . Aug. 29	68	Finding the natural frequency of vibration of exchanger tubes. V. Ganapathy (table, nomograph) (P.N.) . . . Sept. 26	122	
Response of temperature-measuring elements. Paul W. Kardos (diagrams, tables, graphs) . . Aug. 29	79	Water-quality control bill amends delay BAT standards deadline (C) . . . Dec. 5	113	Vinyl Chloride		
Thickeners—New plot enhances value of batch thickening tests. Eli Barnea (tables, graphs) . . Aug. 29	75	Worldwide agreement on control of toxics called for by EPA's Douglas M. Costle (C) . . Nov. 7	61	Amendments to final vinyl-chloride-monomer air-emission standards: 5-ppm maximum within 3 years. EPA announced (C) . . . June 20	62	
Tidal power—Japan will try harnessing ocean waves for power (N) . . . Sept. 12	93	International conference on toxic substances legislation possible (C) . . . Nov. 21	61	Court fight looks over proposed revision (C) . . . Aug. 1	20	
Tires		2,4,6 trinitrotoluene—U.S. Army defuses TNT plant (N) . . . Mar. 28	61	Cancer-causing materials requiring registration in California by July 1 (C) . . . June 20	60	
GM, Firestone, General Tire, and Uniroyal develop new compact spare tire; Firestone offers "advanced concept tire" (C) . . . Sept. 12	88	Tubing		Sweden's KemaNor's average VCM in plant concentrations are below levels achieved elsewhere (C) . . . Jan. 3	37	

NOTES—*Illustrated: (C) Chementator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Fast payout for in plant recovery of spent solvents. James M. Teale (diagram) Jan. 31	98	gram) (N) May 9	*98	of biological treaters (C) Jan. 31	55
Flue-gas-cleaning waste disposal. Julian W. Jones (map, tables) Feb. 14	*79	Recycling business readies for upturn (N) Nov. 21	130	Bulrushes show promise for paring PCBs (N) Apr. 11	79
How sludge characteristics affect incinerator design. R. G. Novak & others (chart, tables, diagrams) May 9	131	Schuch Engineering's recovery process recycles mixed solvents from antibiotics production (C) Sept. 12	88	Carcinogens in drinking water of N.Y.S. (N) Oct. 24	*77
New Mexico to pioneer groundwater regulations (N) Feb. 14	31	Seattle scraps a plan to make ammonia from municipal solid wastes (N) Apr. 25	65	Clarifier catches fine particulates Nov. 21	*133
Nuclear waste disposal: efforts of world-wide groups. Peter R. Savage (N) June 20	*72	Soot from oil- or coal-fired power plants may make a good vanadium source (C) Mar. 28	54	A decade of water-pollution control—report Guide to wastewater treatment Biological-system developments. Davis L. Ford & Lial F. Tischler (graphs) Aug. 15	131
PCBs: Bulrushes show promise for paring PCBs (N) Apr. 11	79	Sugar—A sweet future for sugar products: promising prospects as potential building blocks of many of today's petrochemical products. Philip M. Kohn (N) Jan. 31	63	Physical and chemical methods. Peter B. Lederman (flowscheme) Aug. 15	*135
Radioactive wastes: Acid digestion for low-level radwaste set for tryout (N) May 23	99	Sulfide-precipitation process for removing heavy metals from waste streams (C) May 9	86	Desalting Du Pont challenges U.S. Bureau of Reclamation on contract awards for project at Yuma, Ariz. (C) Nov. 21	113
Radioactive wastes: Isostatic pressing technique for taming "hot" radwastes (N) Mar. 14	81	UC's Brownsville boilers take aqueous wastes as primary fuel (C) July 4	61	Israeli desalting plant slated (N) Sept. 26	47
Reverse Mining taconite-tailings disposal in Lake Superior: case draws to a close (C) Apr. 25	59	Wood: Why not burn wood? J. H. Fernandes (diagram & tables) May 23	*159	Reverse osmosis uses Teijin's new membrane—PBIL polymer (C) Oct. 24	72
Swedish test of granite caverns as radioactive-waste repositories gains European support (C) June 20	61	Water Adjusting pH with acid or caustic. F. Caplan (nomograph) (P.N.) July 4	143	Saudi Arabia: Japanese desalting plant for the Red Sea (C) June 20	61
Toxic wastes: suitable reservoirs for underground storage in eastern U.S. coastal states (N) Feb. 28	121	Cooling-water calculations. R. G. Kunz & others (flowschemes, tables, graphs) Aug. 1	61	Saudi Arabia buys big reverse-osmosis unit from UOP (N) Sept. 26	47
Waste Disposal see also Incineration		ERDA funds cosmic and electrolysis studies aimed at wringing energy from salt water (C) Aug. 1	20	Du Pont's Chambers Works, Deepwater, N.J. wastewater treatment plant uses powdered activated carbon (C) Jan. 3	35
Waste Treatment		Scaling-corrosion: Langelier Index of water by marble test. Arup K. Sengupta (nomograph) (P.N.) Aug. 1	83	The effects of water-pollution control on energy consumption. J. I. Stevens & C. L. Kusik (tables, graphs) Aug. 15	139
The effects of water-pollution control on energy consumption. J. I. Stevens & C. L. Kusik (tables, graphs) Aug. 15	139	Water-gas shift reaction takes place at 95°C using a new catalyst: hydrogen producing reaction (C) July 18	52	Electron radiation to destroy toxic water-pollutants discussed at AIChE meeting (C) Dec. 5	66
Environmental engineering DESKBOOK see DESKBOOKS		Water Pollution Activated carbon: prime choice to boost secondary treatment. John C. Davis (N) Apr. 11	81	Environmental engineering DESKBOOK see DESKBOOKS	
EPA focuses on pretreatment of industrial wastes sent to municipal sewer systems (C) Feb. 28	115	—Letter July 4	5	EPA's 3rd annual National Water Quality Inventory (C) Aug. 15	90
FMC yells "foul" over charges it dumped carbon tetrachloride into the Kanawha River in W. Va. (C) Mar. 14	75	A decade of water-pollution control—report (graphs, flowschemes, tables) (R) Aug. 15	*124	Most U.S. companies comply with water-cleanup deadline. Nicholas P. Chopey (graph) (N) Aug. 1	104
FMC to combat discharges from South Charleston plant via a containment basin (C) Oct. 10	70	The next stage of regulation: specific pollutants—interview with Thomas C. Jorling Aug. 15	*125	New routes compete for spent carbon recovery. Raul Ramirez (table) (N) Sept. 12	*95
Fluorinate wastes cleanup method uses inexpensive commercial soap (N) Apr. 25	65	Industry's view—roundtable discussion Aug. 15	*127	Oil/water splitter nags emulsified oil (flow diagram) July 18	77
Germany: Waste pyrolysis yields chemical feedstocks (C) Aug. 25	19	Guide to wastewater treatment: Biological-system developments. Davis L. Ford & Lial F. Tischler Aug. 15	131	Oxygenation of aqueous wastes: the PROST system. Donald F. Othmer (flowschemes) June 20	117
How sludge characteristics affect incinerator design. R. G. Novak & others (chart, tables, diagrams) May 9	131	Physical and chemical methods. Peter B. Lederman Aug. 15	*135	Plating-wastewater reclamation system ups productivity, cuts water use. Jay E. Warnke & others (flowsheet) Mar. 28	*75
New routes compete for spent-carbon recovery. Raul Ramirez (table) (N) Sept. 12	*95	The effects of water-pollution control on energy consumption. J. I. Stevens & C. L. Kusik Aug. 15	139	Powdered-activated-carbon wastewater treatment process from Amoco (C) Feb. 28	113
Organic Recycling's toroidal dryer dries sewage sludge to a soil builder or landfill (C) Aug. 15	87	Multimedia assessment: an integrated approach to pollution. Eugene E. Berkau & others Aug. 15	148	Radox Wastewater Treatment process cuts organics. Philip M. Kohn (flowscheme, graphs) Aug. 15	108
Oxygenation of aqueous wastes: the PROST system. Donald F. Othmer (flowschemes) June 20	117	Environmental engineering DESKBOOK see DESKBOOKS		Reverse-osmosis installation in Fountain Valley, Calif. (N) July 4	69
Radioactive wastes: Acid digestion for low-level radwaste set for tryout (N) May 23	99	EPA expects to go to court against 300 industrial polluters and 100 municipalities—July 1 deadline (C) July 4	63	Rohm & Haas's "new class of synthetic adsorbents": Amborsorb carbonaceous adsorbents (C) Aug. 29	17
Radioactive wastes: Isostatic pressing technique for taming "hot" radwastes (N) Mar. 14	81	EPA focuses on pretreatment of industrial wastes sent to municipal sewer systems (C) Feb. 28	115	Sludge treatment process: spill-stream thickening, offers flexibility, low cost. Richard R. Evans (flowchart) Dec. 5	86
Reverse-osmosis installation in Fountain Valley, Calif. (N) July 4	69	FMC charged with polluting the Kanawha River in West Virginia with asbestos (C) May 23	95	Texas waterway proves cleanup tide is turning. Wilma Pryblek (graph, diagram) (N) Aug. 15	*98
Sulfide-precipitation process for removing heavy metals from waste streams (C) May 9	86	FMC yells "foul" over charges it dumped carbon tetrachloride into the Kanawha River in W. Va. (C) Mar. 14	75	—Correction Oct. 10	5
Ultrasonics gets a test in oil/water separator (N) Oct. 24	*90	FMC to combat discharges from South Charleston plant via a containment basin (C) Oct. 10	70	Toxicity of industrial wastewaters can increase during treatment (C) June 6	69
Wastewater treatment see Water Treatment		Flue-gas-cleaning wastes disposal. Julian W. Jones (map, tables) Feb. 14	*79	Treating industrial wastewater with activated carbon. Joseph L. Rizzo & Austin R. Shepherd (charts, tables, flowdiagrams) Jan. 3	95
Waste Utilization		Holmes & Narver's ore-leaching process cuts water pollution—under construction in Santiago, Chile (C) July 18	53	—Letter Aug. 1	5
Banner Industries technique—"A process to restructure coal fines into usable form (C) May 9	88	Midcourse evaluation (Ed) Aug. 15	5	Ultrasonics gets a test in oil/water separator (N) Oct. 24	*90
Chicago prepping for fuel-from-refuse startup (N) Jan. 3	43	Most U.S. companies comply with water cleanup deadline. Nicholas P. Chopey (graph) (N) Aug. 15	104	Ultraviolet light enhances ozonization of organics dissolved in wastewater in Westgate Research Corp.'s system (C) Aug. 1	18
Davy Powergas licenses zinc-from-waste process (N) June 6	75	No watering-down seen for U.S. effluent laws. Philip M. Kohn (N) Aug. 15	95	Underground wastewater treatment from ICI gets a boost (N) Jan. 3	43
ERDA requests proposals for a direct-combustion system feeding on Pennsylvania anthracite waste piles (C) June 20	60	Oil spills see Petroleum—Oil spills		Wastewater aeration system produces small bubbles Aug. 25	*81
Fast payout for in-plant recovery of spent solvents. James M. Teale (diagram) Jan. 31	98	Texas waterway proves cleanup tide is turning. Wilma Pryblek (graph, diagram) (N) Aug. 15	*98	Water-quality control bill amendments delay BAT standards deadline (C) Dec. 5	68
Garbage-to-fuel facility set for full construction in Newark, N.J. by late 1979 (N) July 4	69	—Correction Oct. 10	5	Watertek, six-step, wastewater treatment system treats microwaves (flowsheet) Jan. 1	77
Gould's scrap rubber tire reclamation process (C) July 4	61	Water Pollution Control Act amendments of 1972 get changes (C) Aug. 29	20	Weather—The long drought: Will it shrivel CPI options. Guy E. Weismantel (N) (diagram) Nov. 21	119
Hooker Chemicals garbage incinerator at Niagara Falls, N.Y. scheduled for 1979 (C) July 4	62	Water sampling: Glass particles treated with chelating agents may cut costs (C) Oct. 24	73	Weighing—Methods for conveying and weighing solids (charts, tables, diagrams) Feb. 28	176
Imperial West uses aluminum-mill metal wastes to make alum (C) Oct. 10	69	Water Supply Congress authorizes \$ to implement the Safe Drinking Water Act of 1974 (N) Apr. 15	93	Designing for batch and continuous weighers. J. R. Mitchell Feb. 28	177
Municipal-solid-waste pyrolysis in California (N) Jan. 17	75	Drinking water: Carcinogens in N.Y.S. drinking water (N) Oct. 24	77	Using helical screws for solids handling. L. Bates Feb. 28	183
New route competes for spent-carbon recovery. Raul Ramirez (table) (N) Sept. 12	*95	The long drought: Will it shrivel CPI options. Guy E. Weismantel (N) (diagram) Nov. 21	119	Welding—Practices that minimize corrosion. Frank C. Brautigan Jan. 17-145, Feb. 14	*97
Plating-wastewater reclamation system ups productivity, cuts water use. Jay Warnke & others (flowsheet) Mar. 28	*75	Water Treatment Activated carbon: prime choice to boost secondary treatment. John C. Davis (N) Apr. 11	81	Wind Energy GE contracts for world's two largest windmills under a test program (N) Jan. 3	43
Recycling: Energy policy should push recycling, says NARI (N) Apr. 11	79	—Letter July 4	5	Wind-energy conversion systems from Hamilton Standard and Statsforetag AB (C) Oct. 10	70
Recycling: Hydrogen recovery unit ups NH ₃ plant efficiency. Roy Banks (flowscheme, table, graph) Oct. 10	90	British researchers find simple oxygen injection in sewer mains feeding wastewater treatment plants sharply reduces the size and cost		Wind turbine-generator to be tested (N) Oct. 10	117
Recycling: Needs and knowhow boost aluminum recycle. Guy E. Weismantel (table, diagram) May 23	*159			Wood—Why not burn wood? J. H. Fernandes (diagrams & tables) May 23	*159

NOTES—*Illustrated: (C) Cumentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Writing—Write and present persuasive reports.
Douglas W. Hissong July 4

X

Xylene

Dynamic challenges for tomorrow's, CPI—
reports: Materials and energy
Future supply and demand for basic pet-
rochemicals. Eugene J. Debreczeni
(charts) June 6
Hercules Inc.'s new process for making purified
terephthalic acid (C) July 18

Z

Zeolites—Badger's methanol-to-gasoline plant
under DOE contract to use Mobil's zeolite
catalyst technology (C) Dec. 5

Zinc

Applicator's guide to zinc-rich primers. Dean M.
Berger (charts) Mar. 14
Davy Powergas licenses zinc-from-waste pro-
cess (N) June 6

AUTHOR INDEX

Adler, Paul
Right absorber oil cuts operating costs Dec. 5

Anderson, Mark C.
Recovery calculation for a separation pro-
cess Dec. 19

Armstrong, Enrique J.
Equipment-purchasing policies that save en-
ergy July 4

Arnold, Wesley D. & others
Recovering uranium from wet-process phos-
phoric acid Jan. 3

Arzumani, G. G. & others
Testing olefin-polymerization catalysts Jan. 31

Atallah, Sami
Security for CPI Oct. 10

Balasubramanian, G. H. & K. Sivasankaran
How to design a metering system Aug. 29

Balzhiser, Richard E.
Energy options to the year 2000 Jan. 3

Banks, Roy
Hydrogen recovery unit ups NH₃-plant ef-
ficiency Oct. 10

Barbi, Alessio & Franco Colautti
Sponge-iron process combines flexibility, low
costs Apr. 25

Barnea, Eli
New plot enhances value of batch-thickening
tests Aug. 29

Basso, Arthur J.
Getting the most out of filteraids Sept. 12

Bates, L.
Using helical screws for solids handling Feb. 28

Becker, David L. & others
Multimedia assessment: an integrated ap-
proach to pollution Aug. 15

Beer, M. A. & J. A. Andrade Leite
Air dilution for sulfuric acid plants Nov. 21

Belcher, D. W. & others
Analyzing suspended-particle dryers with
psychrometric charts Jan. 17

Benenati, Robert F.
Solving engineering problems on program-
mable pocket calculators. Pt. I Feb. 28 *102 ..
Pt. II Mar. 14

Berger, Dean N.
Applicator's guide to zinc-rich primers Mar. 14

Bergtraum, Eric M.
How corrosion theory relates to protective coat-
ings I. Aug. 1-77 II. Aug. 29

Berkau, Eugene E. & others
Contracting for new construction June 20

Berkau, Eugene E. & others
In-plant vs. contract maintenance Mar. 28

Berkau, Eugene E. & others
Multimedia assessment: an integrated ap-
proach to pollution Aug. 15

Bevan, Denis & Jesse C. Z. Ku
Outdoor bulk storage for hydrophilic materi-
als Aug. 29

Bisset, Larry
Equilibrium constants for shift reactions Oct. 24

Blackburn James W.
Removal of salts from process wastewaters Oct. 17

Brautigam, Frank C.
Welding practices that minimize corrosion
Jan. 17-145 Feb. 14

Brown, Thane R.
Economic evaluation of future equipment
needs Jan. 17

Browning, Jon E. & Clifford Neely
Sources of capital for growth of process
plants June 6

Buehner, Frank W.
OSHA, EPA and plant design June 6

Bump, Robert L.
Electrostatic precipitators in industry Jan. 17

Buse, Fred
The effects of dimensional variations on cen-
trifugal pumps Sept. 26

Calvert, Seymour
How to choose a particulate scrubber Aug. 29

Caplan, F.
Upgrading existing particulate scrubbers Oct. 24

Caplan, F.
Adjusting pH with acid or caustic July 4

Carleton, A. J. & D. C. H. Cheng
Space requirements for stairs Aug. 1

Carpenter, David B.
Pipeline design for industrial slurries Apr. 25

Cavaso, Vincent
The uses of custom processing Oct. 10

Chao, E. C. & others
Meet a tough contender: dry cleanable leather
design Sept. 12

Chauhan, R. S. & Daljit Singh
Data deficiency hampers coal-gasification plant
design May 9

Cheng, D. C. H. & A. J. Carleton
Solar water heater Feb. 14

Childs, Edmund S.
Pipeline design for industrial slurries Apr. 25

Choi, Nicholas P.
Markets for U.S. thermoplastics Sept. 12

Choque, Nicholas P.
Most U.S. companies comply with water-clean-
up deadline Aug. 15

Churchill, Stuart W.
Friction-factor equation spans all fluid-flow re-
gimes Nov. 7

Colautti, Franco & Alessio Barbi
Sponge-iron process combines flexibility, low
costs Apr. 25

Constance, John D.
What makes a "professional climate"? Dec. 5

Cook, E. M. & F. W. Dittman
Establishing the parameters for a spray dryer
Jan. 17

Cook, E. M. & others
Analyzing suspended-particle dryers with
psychrometric charts Jan. 17

Cordero, Rene
The cost of missing pipe insulation Feb. 14

Creason, Samuel C. & others
Wastewater reclamation system ups productiv-
ity, cuts water use Mar. 28

Crom, Russell C. W.
Safeguarding against shock hazards Mar. 28

Crump, Joseph R. & Frank M. Tiller
How to increase filtration rates in continuous
filters June 6

Cudaby, J. J. & others
How sludge characteristics affect incinerator
design May 9

Cummings-Saxton, James
Demand for and education of chemical
engineers up to 2000 June 6

Curran, David Francis
Shortsighted supervisors: victims of the choco-
late ice cream syndrome Aug. 1

Dalstad J. Ingemar
Slurry pump selection and application Apr. 25

Dautovich, David R. & Mileta Mikasinovic
Designing steam transmission lines without
steam traps Mar. 14

Davis, Charles H. & John R. Douglas
Fertilizer supply and demand July 18

Davis, Gerald O.
How to make the correct economic decision on
spare equipment Nov. 21

Davis, John C.
Activated carbon, prime choice to boost sec-
ondary treatment Apr. 11

Deburd, Ralph M.
Caution marks progress in coal-conversion
plan Oct. 10

Deburd, Ralph M.
CPI contractors size up 1977 Jan. 3

Deburd, Ralph M.
Conversion to coal firing picks up steam Feb. 14

Deburd, Ralph M.
Crude-oil cracking gains June 6

Deburd, Ralph M.
FCC units get crack catalysts Sept. 12

Deburd, Ralph M.
Metals find new role as hydrogen reser-
voirs Nov. 21

Deburd, Ralph M.
Metrication scorecard Oct. 24

Deburd, Ralph M.
Future supply and demand for basic pet-
rochemicals June 6

Denery, William F.
OSHA—Where it stands, where it's going Apr. 11

Denny, Dale A. & others
Multimedia assessment: an integrated ap-
proach to pollution Aug. 15

Denove, M. R. & others
How sludge characteristics affect incinerator
design May 9

Diaz, Hector E. & Arkady Pikulik
Cost estimating for major process equip-
ment Oct. 10

Dickinson, W. C.
Economics of process heat from solar energy Jan. 31

Dittman, F. M.
Methods for analyzing drying equipment
How to classify a drying process Jan. 17

Dittman, F. W. & E. M. Cook
Drying slabs, sheets, and beds Jan. 17

Dittman, F. W. & E. M. Cook
Establishing the parameters for a spray dryer
Jan. 17

Doerschlag, Christian & Gerhard Miczek
How to choose a cyclone dust collector Feb. 14

Doolin, John H.
Select pumps to cut energy cost Jan. 17

Doonan, J. R. & others
Testing olefin-polymerization catalysts Jan. 31

Douglas, John R. & Charles H. Davis
Fertilizer supply and demand July 18

Duhne, Carlos R.
Calculating the approach to equilibrium Aug. 29

Eisenhart-Rothe, M. V. & I. A. S. Z. Peschl
Powder testing techniques for solving industrial
problems Mar. 28

Elliot, Ralph I. & Jerry R. Perrieh
You're as efficient as your files Oct. 24

Elton, Richard L. & Davis L. Elton
Removal of oil and grease from industrial was-
tewaters Oct. 17

Evans, Richard R.
Sludge treatment process offers flexibility, low
cost Dec. 5

Fernandes, J. H.
Why not burn wood? May 23

Filippello, A. Nicholas
Forecasting and planning June 6

Ford, Davis L. & Richard L. Elton
Removal of oil and grease from industrial was-
tewaters Oct. 17

Ford, Davis L. & Lial F. Tischler
Guide to wastewater treatment: Biological sys-
tems developments Aug. 15

Frank Otto
Shortcuts for distillation design Mar. 14

Frith, J. F. S. & others
Data deficiency hampers coal-gasification plant
design May 9

Fujé, Dave
A rhyme for differentiating fractions Apr. 11

Ganapathy, V.
Basic data for steam generators—at a glance
June 6

Ganapathy, V.
Charts simplify spiral finned-tube calculations
Apr. 25

Ganapathy, V.
Estimating the holdup in dished heads Feb. 14

Ganapathy, V.
Finding the natural frequency of vibration of
exchanger tubes Sept. 26

Ganapathy, V.
Quick calculations for piping insulation Nov. 21

Ganapathy, V.
A quick way to figure slurry densities July 4

Ganapathy, V.
Relating heat emission to surface tempera-
tures Dec. 19

Ganapathy, V. & others
Physical properties of selected gas-streams Feb. 28

Garrett, Donald E.
Pinpointing the needs in research and devel-
opment June 6

Gelburd, Ralph M.
A comprehensive approach to occupational
safety and health Apr. 11

Gelman, S. F. & others
Testing olefin-polymerization catalysts Jan. 31

Gilbert, William
Troubleshooting wet scrubbers Oct. 24

Gleason, Thomas G.
Halt corrosion in particulate scrubbers Oct. 24

Gold, R. F. & others
Testing olefin-polymerization catalysts Jan. 31

Goyette, Jack
Estimating the costs of steam leaks Aug. 29

Greene, Richard
Carbonated-drink packs: some to fizzle out? July 18

NOTES—*Illustrated: (C) Cimentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Chemical engineering schools are rated in new report Oct. 24	88	Kirby, Ralph C. Chemical engineers in the metals field June 20	111	Manieh, Atef Aly Comparing equilibrium stages with transfer units May 9	163
Food-dye users see red over FDA color bans Jan. 17	82	Kirkpatrick, F.S. & Howard S. Rossman Hiring practices that attract engineers July 18	113	Mannon, James H. Hot future for ceramics Dec. 5	75
Health growth ahead for the pigments group Sept. 26	58	Kivenson, Gilbert You can profit from reading patents Aug. 15	163	Marbach, Merritt G. Better visuals make speeches better Mar. 14	141
Product liability: on the verge of reform Dec. 5	73	Klasens, H.A. Analyze stack gases via sampling or optically, in place Nov. 21	201	Margus, Ed Plastic centrifugal pumps for corrosive service Feb. 28	213
Pulp plant gets set to sail Aug. 29	30	Knoepke, John Tracer-gas system determines flow volume of flue gases Jan. 31	91	Marion, Larry U. S. CPI to face new demands in chemicals—output reporting Aug. 29	32
Report reveals CPI growth signals Nov. 7	56	Koch, Wolfgang H. & William Licht New design approach boosts cyclone efficiency Nov. 7	80	Markovitz, Richard E. Process and project data pertinent to vessel design Oct. 10	123
Utilities scrub out SO _x May 23	101	Kohn, Philip M. Adding an a la carte touch to processed-foods menu Sept. 26	49	Marshall, Tyler the U. K. tries for all metric Nov. 21	124
Grossman, Lee Lighten your paperwork load Nov. 7	101	Kohn, Philip M. Can Canada's CPI cope? Apr. 25	67	Martignoni, David R. Heat more efficiently—with electric immersion heaters May 23	141
Harrison, Michael R. & Charles M. Pelanne Cost effective thermal insulation Dec. 19	62	Kohn, Philip M. CPI firms map strategy for energy-saving plans Nov. 7	49	Matley, Jay Future opportunities favor chemical engineers June 6	150
Hawk, C.W., Jr. Do you understand galvanic corrosion? June 6	189	Kohn, Philip M. Hopes fly high for new hydrogen processes Mar. 14	86	McDonough, Roger Job outlook: brightest since 1967 Oct. 10	135
Haynes, Marion E. How do you score as a delegator? Sept. 12	179	Kohn, Philip M. Microwave technology: penetrating CPI markets Jan. 3	50	McDonough, Roger Job outlook: hiring upswings stalls Feb. 28	209
Hazelwood, Loren F. Learn computer programming the convenient way Jan. 3	103	Kohn, Philip M. No watering-down seen for U.S. effluent laws Aug. 15	95	McDonough, Roger See how your salary looks now Jan. 17	141
Helstrom, John J. & Ramdas Venkatram How to make a mounting for rotameter tubes Dec. 19	104	Kohn, Philip M. Process provides option for nonleaded-gas makers May 23	114	McDonough, Roger What help can you expect when you relocate? Dec. 19	93
Helzner, Albert E. Operating performance of steam-heated reboilers Feb. 14	73	Kohn, Philip M. Pulp-bleaching process cuts costs, time, effluent Feb. 28	136	Maxwell, Michael A. & Norman Kaplan Removal of SO ₂ from industrial waste gases Oct. 17	127
Hershey, T. A viewing port for spattering processes Apr. 11	160	Kohn, Philip M. The ring tightens on benzene emissions July 18	84	McDonough, Roger Selecting sight flow indicators July 4	113
Hess, T. C. & others Cooling-water calculations Aug. 1	61	Kohn, Philip M. Saccharin substitutes find no sugar coating in ban June 6	60	McDonough, Roger Choosing materials for sulfuric-acid services July 4	137
Hewitt, William T. & George M. Zapp Industry outlook for inorganic chemicals June 6	128	Kohn, Philip M. A sweet future for sugar products Jan. 31	63	McKay, Rita Plastics move to make a bigger dent in cars July 4	78
Hissong, Douglas W. Write and present persuasive reports July 4	131	Kohn, Philip M. Uranium enrichment methods detailed at meeting Jan. 31	108	McKelvey, Thomas C. Data to estimate equipment capabilities in different operations July 4	146
Hock, Allison Some of your manners may not travel well Nov. 21	211	Kohn, Philip M. Water treatment system cuts organics Aug. 15	157	Mickel, Gerhard & Christian Doerschlag How to choose a cyclone dust collector Feb. 14	64
Holland, F.A. & F.A. Watson Economic penalties of operating a process at reduced capacity Jan. 3	91	Ku, Jesse C.Z. & Denis Bevan Outdoor bulk storage for hydrophilic materials Aug. 29	108	Mikasinovic, Mileta & David R. Dautovich Designing steam transmission lines without steam traps Mar. 14	137
Profitability studies I. Putting inflation into profitability studies Feb. 14	87	Kulkarni, P.D. & P.S. Phadke Estimating costs and weights of process vessels Apr. 11	61	Miksic, Boris A. Volatile corrosion-inhibitors find a new home Sept. 26	115
II. Project risk, inflation, and profitability Mar. 14	133	Kunz, R.G. & others Tubewise heat-transfer Feb. 14	139	Miller, J. S. & W. A. Kapella Installed cost of a distillation column Apr. 11	129
Hopkins, John H. & Robert C. Lasater Removing particulates from stack gases Oct. 17	111	Kunz, R.G. & others Cooling-water calculations Aug. 1	73	Miranda, Julio G. Designing parallel-plates separators Jan. 31	105
Horner, C.W. A formaldehyde process to accommodate rising energy costs July 4	108	Kusik, C.L. & J.I. Stevens The effects of water-pollution control on energy consumption Aug. 15	99	Mitchell, J. R. Designing for batch and continuous weighers Feb. 28	177
Howard, Graham W. Installing and maintaining V-belts July 18	117	Lanouette, Kenneth H. Heavy metals removal Oct. 17	111	Moe, James & David Netzer Ammonia from coal Oct. 24	129
Huerst, Fred J. & others V-belt problems and solutions Aug. 15	167	Lanouette, Kenneth H. Treatment of phenolic wastes Oct. 17	137	Morgan, John D., Jr. Chemical Engineers in the Metals Field June 20	111
Recovering uranium from wet-process phosphoric acid Jan. 3	56	Lasater, Robert C. & John H. Hopkins Removing particulates from stack gases Oct. 17	119	Morris, Howard, Jr. Inspect tank cars before shipping in them Nov. 7	109
Janakiraman, V. & others Physical properties of selected gas-streams Feb. 28	195	Leach, M. J. An approach to multiphase vapor-liquid equilibria May 23	135	Mottola, Alex C. Diffusivities streamline wet scrubber design Dec. 19	77
Jentz, N.E. & others Materials challenges of coal liquefaction Apr. 11	147	Leather, J. M. Future changes in chemical engineering June 6	107	Mukerji, Asu Unloading and storage technique for vinyl chloride monomer May 23	155
Jones, Julian W. Disposal of flue-gas-cleaning wastes Feb. 14	79	Lederman, Peter B. Guide to wastewater treatment: Physical and chemical methods Aug. 15	129	Murphy, Thomas D., Jr. Design and analysis of industrial experiments June 6	168
Jorling, Thomas C. The next stage of regulation: specific pollutants—interview Aug. 15	125	Lee, R. P. Systematized failure analysis Jan. 3	156	Neely, Clifford & Jon E. Browning Sources of capital for growth of process plants June 6	142
Kapella, W.A. & J.S. Miller Installed cost of a distillation column Apr. 11	129	Lee, R. P. Some unusual failure modes Jan. 3	80	Netzer, David & James Moe Ammonia from coal Oct. 24	129
Kaplan, Norman & Michael A. Maxwell Removal of SO ₂ from industrial waste gases Oct. 17	127	Leitte, J. A. Andrade & M. A. Beer Air dilution for sulfuric acid plants Nov. 21	127	Norden, Robert B. 1977 capital spending: a cautious upswing Nov. 21	108
Kardos, Paul W. Response of temperature-measuring elements Aug. 29	79	Lemlich, Robert Trigonometry's chief ratios Oct. 24	147	Novak, R. G. & others How sludge characteristics affect incinerator design May 9	131
Kern, Robert Plant layout—CE Refresher 1. How to manage plant design to obtain minimum cost May 23	130	Licht, William & Wolfgang H. Koch New design approach boosts cyclone efficiency Nov. 7	95	O'Hara, J. B. & others Materials challenges of coal liquefaction Apr. 11	147
2. Specifications are the key to successful plant design July 4	123	Lieberman, Norman Instrumenting a plant to run smoothly Sept. 12	149	Okun, Sherman K. Checkpoints for a foreign assignment June 6	189
3. Layout arrangements for distillation columns Aug. 15	153	Lin, H. M. & others Data deficiency hampers coal-gasification plant design May 9	107	Othmer, Donald F. Oxygenation of aqueous wastes: the PROST system June 20	117
4. How to find the optimum layout for heat exchangers Sept. 12	169	Lochmann, W. J. & others Materials challenges of coal liquefaction Apr. 11	122	Parkinson, Gerald Soda ash plant exploits mineral-laden brine Nov. 7	62
5. Arrangements of process and storage vessels Nov. 7	93	Lock, Mary C. Combat stress with an ancient cost-free therapy May 23	123		
6. How to get the best process-plant layouts for pumps and compressors Dec. 5	131	Lord, Harry C. CO ₂ measurements can correct for stack-gas dilution Jan. 31			
Pressure-relief valves for process plants Feb. 28	187	Luks, Allan How you can help the alcoholic May 9			
King, Robert A. How to achieve effective project control July 4	117	Mahajan, Kanti K. A method for designing rectangular storage tanks Mar. 28			

NOTES—*Illustrated: (C) Cimentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available

Index to Vol. 84, January to December 1977

Paulson, E. G. How to get rid of toxic organicsOct. 17 Reducing fluoride in industrial wastewater Oct. 17	21	Rosebrook, Donald D. Fugitive hydrocarbon emissionsOct. 17	*143	Determining ideal stages on a pocket calculatorMar. 14	154
Pelanne, Charles M. & Michael R. Harrison Cost effective thermal insulationDec. 19	*62	Rosenzweig, Mark D. All-maintenance firms clean up in the CPI ... Dec. 5	*78	Teale, James M. Fast payout from in-plant recovery of spent solventsJan. 31	98
Perreault, Edmund A. & Paul J. Prutzman Strategies for curtailing electric powerMay 23	153	Brainstorming saves energyJuly 4	*74	Thomas, Kenneth H. & others Wastewater reclamation system ups productivity, cuts water usesMar. 28	*75
Perrella, Anthony V. Pitfalls in evaluating R&DAug. 1	59	Direct iron reduction: the role widens for natural-gas alternativesFeb. 28	128	Thompson, George S. & others Multimedia assessment: an integrated approach to pollutionAug. 15	148
Perrich, Jerry R. & Ralph I. Elliott You're as efficient as your filesOct. 24	*151	Motionless mixers move into new processing rolesMay 9	*95	Tiller, Frank M. & Joseph R. Crump How to increase filtration rates in continuous filtersJune 6	183
Peschl, I. A. S. Z. & M. v. Eisenhart-Rothe Powder testing techniques for solving industrial problemsMar. 28	97	Propylene oxide routes are ready to take off .. Oct. 24	84	Tippin, R. Bruce Potash flotation method handles variable feedJuly 18	73
Peterson, William C. & Thomas A. Wells Energy-saving schemes in distillationSept. 26	*78	Tobacco supplement seeks to catch fire in BritainJune 20	*80	Tischler, Lial F. & Davis L. Ford Guide to wastewater treatment: Biological-system developmentsAug. 15	131
Phadke, P. S. & P. D. Kulkarni Estimating costs and weights of process vesselsApr. 11	157	Rossman, Howard S. & F. S. Kirkpatrick Hiring practices that attract engineersJuly 18	113	Turner, W. & B.G. Mandelk Selective oxidation in sulfuric and nitric acid plants: current practicesApr. 25	123
Pierce, Robert R. Estimating acid dewpoints in stack gasesApr. 11	125	Russell, D. L. How to convert decimals to the nearest fractionAug. 1	83	Venkatram, Ramdas & John J. Helstrom How to make a mounting for rotameter tubesDec. 19	104
Pikulik, Arkadie & Hector E. Diaz Cost estimating for major process equipmentOct. 10	*106	Russell, Richard A. Improve your efficiency in writing computer programsApr. 25	111	Vogel, Jack M. It takes more than engineering talentAug. 29	85
Pinto, A. & P. L. Rogerson Optimizing the ICI low-pressure methanol processJuly 4	102	Ryon, Allen D. & others Recovering uranium from wet-process phosphoric acidJan. 3	56	Waltrich, P.F. & M.R. Spotts Vacuum dryersJan. 17	120
Pollack, Michael J. Conductivity measurement: what it is, how it worksSept. 12	*161	Savage, Peter R. Coping with costly energy: the international viewAug. 1	27	Warnke, Jay E. & others Wastewater reclamation system ups productivity, cuts water useMar. 28	*75
Poullis, Nicholas J. & David Silvermetz Instrumentation for slurry systemsApr. 25	107	New feeds and processes perk ammonia productionOct. 24	*79	Wass, W.E. & others How sludge characteristics affect incinerator designMay 9	131
Prescott, James H. Ethylene: the end of an eraMar. 28	63	Nuclear-power prospects soured by oxide-fuel-reprocessing stallFeb. 28	*123	Watkins, James P. Controlling sulfur compounds in wastewatersOct. 17	61
Small is in, big is out in oil refining worldOct. 10	80	Nuclear waste disposal Politics Cloud ProspectsJune 20	*72	Watson, F.A. & F.A. Holland Economic penalties of operating a process at reduced capacityJan. 3	91
Synthesized lubricants vie for role in car enginesJune 6	84	Slagging gasifier aims for SNG marketSept. 12	108	Profitability studies I. Putting inflation into profitability studiesFeb. 14	87
Prutzman, Paul J. & Edmund A. Perreault Strategies for curtailing electric powerMay 23	153	Schaal, Ernest A. Hints on reading patentsNov. 7	89	II. Project risk, inflation, and profitabilityMar. 14	133
Pryblek, Wilma Texas waterway proves cleanup tide is turningAug. 15	*98	Scherberger, Richard F. Industrial hygiene control methodsApr. 11	*118	Webb, Henry E., Jr. What to do when disaster strikesAug. 1	*47
Purarelli, Claudio Heat-capacity ratios for real gasesMar. 14	153	Scherer, William T. Is caring about people a lot of hogwash?Feb. 14	93	Weismantel, Guy E. Can U.S. firms still compete abroad? Aug. 29	25
Putnam, Borden R. Consequences of regulation: short range long rangeJune 6	158	Schmidt, Thomas R. Ground-level detector tames flare-stack flamesApr. 11	*121	The long drought: Will it shrivel CPI optionsNov. 21	119
Raghavachari, S. Cutting costs with more expensive temperature indicatorsDec. 19	103	Schneider, Raymond T. Calculate enthalpy with a pocket calculatorMay 23	145	Needs and knowhow boost aluminum recycleMay 9	*98
Savings with standardized thermowellsApr. 11	160	Schoellner, Joan Living in the Middle East a wife's viewJune 20	121	Plant-siting barriers growJune 20	69
Rains, William A. Fire resistance—how to test for itDec. 19	97	Schofield, C. & H.M. Sutton Systems approach for in-plant bulk materials handlingMar. 28	103	Uranium-enrichment updateJan. 17	*77
Rajamohan, A. & others Physical properties of selected gas-streamsFeb. 28	195	Schumacher, W.J. Wear and galling can knock out equipmentMay 9	155	Where will North Slope oil go?Mar. 14	*83
Rao, A. K. Prediction of liquid activity coefficientsMay 9	143	Semrau, Konrad T. Practical process design of particulate scrubbersSept. 26	87	Weiss, W.H. Management by exception in operations and maintenanceDec. 5	151
Raudsepp, Eugene Do a better job of selling your ideas2. Apr. 25	133	Sengupta, Arup K. Scaling-corrosion test made easyAug. 1	83	Wells, Thomas A. & William C. Peterson Energy-saving schemes in distillationSept. 26	*78
Play games to spark your creativitySept. 26	109	Sharp, Edgar C., Jr. Operating and maintenance records for heating equipment Pt. I Apr. 25-141 Pt. II May 23	171	Wild, Norman H. Program for discounted-cash-flow return on investmentMay 9	*137
Ravichandran, R. & others Physical properties of selected gas-streamsFeb. 28	195	Shaw, Jane S. What's wrong with engineers' jobJan. 31	123	Williams, David Microprocessors enhance computer control of plantsJuly 18	*95
Reed, Robert D. Nitrogen oxide problems in industryOct. 17	153	Shepherd, Austin R. & Joseph L. Rizzo Treating industrial wastewater with activated carbonJan. 3	95	Willis, R.P. Rapid sizing of vessel nozzles for safety-valve serviceJune 6	200
Remirez, Paul LNG program: Is it cooling off?Oct. 10	86	Shields, Robert Finding and fixing hot pumps bearingsDec. 19	103	Wither, Edward Equilibrium-flash calculations with the SR-56Sept. 26	121
New routes compete for spent-carbon recoverySept. 12	*95	Silvermetz, David & Nicholas J. Poullis Instrumentation for slurry systemsApr. 25	207	Yedidiah, S. Diagnosing troubles of centrifugal pumps I. Oct. 24 *124, II. Nov. 21-193 III. Dec. 5	141
Ricci, Larry J. CPI firms aim to clean up with new detergentsMay 23	*104	Singh, Daljit & R.S. Chauhan Solar water-heaterFeb. 14	106	Yen, A.F. & others Cooling-water calculationsAug. 1	61
Chemicals giving birth to human reproductive woesAug. 1	30	Sisson, Bill Calculate fertilizer blends by nomographMar. 14	156	Yen, L.C. & others Data deficiency hampers coal-gasification plant designMay 9	127
Cryogenic grinding: no quick thaw in CPI useJuly 4	*71	Calculating the required tension on V-beltsMay 9	164	Zanker, Adam Designing spouted bedsNov. 21	207
Electric spark of ionizers hikes scrubber efficiencySept. 26	52	Steam from flashing condensateFeb. 14	105	Hydrocyclones: dimensions and performanceMay 9	122
EPA sets its sight on nixing CPI's NO _x emissions (R)Pt. 1 Feb. 14-33, Pt. 2 Apr. 11 *84Pt. 3 Apr. 25	70	Sivasankaran, K. & G.R. Balasubramanian How to design a metering systemAug. 29	96	Industry outlook for inorganic chemicalsJune 6	128
Fuel efficiency thrust ups sales of additivesNov. 7	52	Smith, D.A. & others Analyzing suspended-particle dryers with psychrometric chartsJan. 17	112	Zaremba, Mark J. Adding dimensions in English unitsNov. 21	222
U.S. chemicals to top \$100 billion in '77Mar. 28	66	Spotts, M.R. & P.F. Waltrich Vacuum dryersJan. 17	120	Zdonik, S.B. Balancing energy costs against equipment costsJuly 4	99
Ridlon, Stephen How to verify computer programsJune 20	121	Standifer, R.L. & others How sludge characteristics affect incinerator designMay 9	131	Zenz, Frederick A. How flow phenomena affect design of fluidized bedsDec. 19	81
Rizzo, Joseph L. & Austin R. Shepherd Treating industrial wastewater with activated carbonJan. 3	95	Stevens, J.I. & C.L. Kusik The effects of water-pollution control on energy consumptionAug. 15	139		
Roe, Lawrence A. Mineral processing methods: review and forecastJune 20	*102	Surtes, L.S. & P. Rooney Tips on FRP pipingNov. 21	215		
Rogerson, P. L. & A. Pinto Optimizing the ICI low-pressure methanol processJuly 4	102	Sutton, H.M. & C. Schofield Systems approach for in-plant bulk materials handlingMar. 28	103		
Rooney, P. & L. S. Surtees Tips on FRP pipingNov. 21	215	Tan, H. Calculation of J functions by a pocket calculatorOct. 24	158		

NOTES—*Illustrated: (C) Cimentator; (N) News; (P.N.) Plant Notebook; (R) Reprints available